Important Note!

This »Maintenance Manual« is an original service guide of the OKI Data Corporation, Japan.

Do not use the spare parts list in this »Maintenance Manual«, it is only listed for the sake of completeness.

If you want to order spare parts use only the spare parts lists in the German »Service Training Manuals« or in the separate spare parts list of the OKI Systems (Deutschland) GmbH.

Wichtiger Hinweis!

Dieses »Maintenance Manual« ist ein Original-Service-Handbuch der OKI Data Corporation, Japan.

Verwenden Sie nicht die Ersatzteilliste in diesem »Maintenance Manual«, sie ist nur der Vollständigkeit halber aufgeführt.

Benutzen Sie für Ersatzteilbestellungen ausschließlich die Ersatzteillisten in den deutschen »Service Training Manuals« oder in den separaten Ersatzteillisten der OKI Systems (Deutschland) GmbH.

OKI

OKIPAGE4*m*
LED Page Printer

Troubleshooting Manual with Component Parts List (OEL)

APPROVAL

All specifications are subject to change without notice.

CONTENTS

1. OUTLINE 1
2. TOOLS 1
3. CIRCUIT DESCRIPTION 2
4. TROUBLESHOOTING 21
5. CIRCUIT DIAGRAM 28
6. COMPONENT PARTS LIST

1. OUTLINE

This manual has been written to provide guidance for troubleshooting of the OKIPAGE4m Printer (primarily for its printed circuit boards), on an assumption that the reader is knowledgeable of the printer. Read the maintenance manual for this printer P/N if necessary.

Note:

1. High voltage power supply board and power supply unit containing a high voltage power supply is dangerous. From the viewpoint of the safety standards, the local repairing of a defective board is not allowed. Thus, the objects to be locally repaired as a result of troubleshooting are switches and fuses.

2. TOOLS

For troubleshooting the printer, the tools listed below may be needed in addition to general maintenance tools.

Tool	Remarks
Oscilloscope	Frequency response 100 MHz or higher
Soldering iron	A slender tip type, 15-20 watts
Ectension code kit	P/N : 40105501

3. CIRCUIT DESCRIPTION

3.1 Outline

The circuit of OKIPAGE4m consists of a main control board, a high voltage power supply board and a power supply unit. The block diagram is shown in Fig. 3-1. The main control board controls the reception and transmission of data with a host I/f and processes command analysis, bit image development, raster buffer read. It also controls the engine and high voltage outputs.

(1) Reception and transmission control
The main control board has parallel I/F port which is compliant to the IEEE 1284 specification and serial I/F (Macintosh I/F) port which is compliant to the RS-422 specification.
An interface task stores all data received from the host into a receive buffer first, and returns the printer status upon request of the host.

(2) Command analysis processing
The OKIPAGE4m printer has the following emulation mode.
Hiper-W: OKI original
An edit task fetches data from the receive buffer, analizes commands, and sets I/O registers.

(3) Raster data processing
The decompression circuit in the CPU expands the compressed data and stores the data into the raster buffer.

(4) Raster data transfer
The LED head control circuit in the CPU sends the data stored in the raster buffer to the LED head.

(5) High voltage control
The high voltage control circuit in the CPU.

The high voltage power supply board generates high voltage outputs, and have sensors, LED for display.
The power supply unit generates +24VDC output, +5DC output.

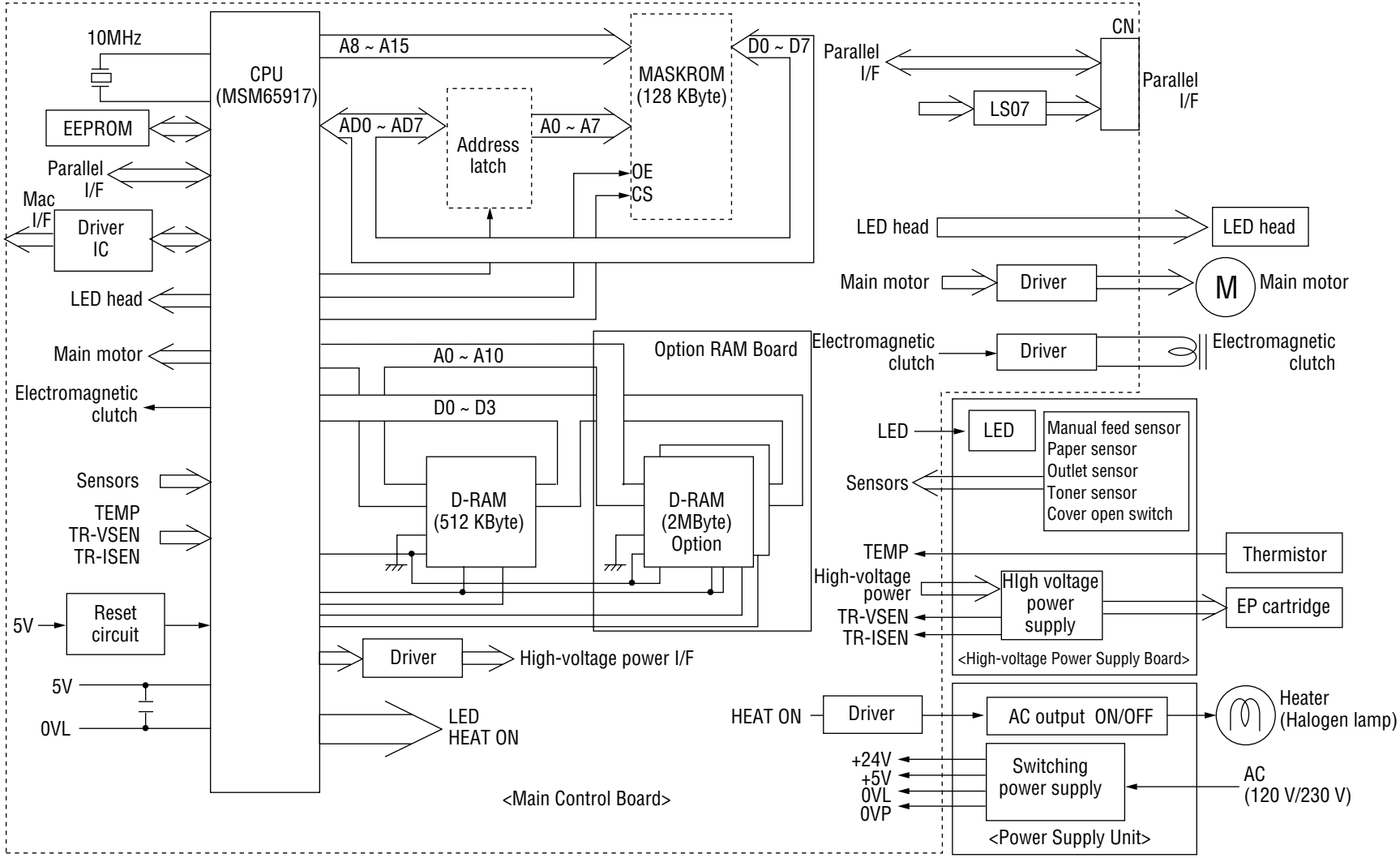


Figure 3-1 OKIPAGE4w Block Diagram

3.2 CPU and Memory

(1) CPU (MSM65917)

CPU core	nX-8
CPU clock	10 MHz
Data bus width	External 8 bits, Internal 8 bits

(2) Program ROM

ROM capacity	128k-bytes (1-Mbit MASKROM)
ROM type	1 Mbits (128k x 8 bits)
Access time	150 nsec

When mask ROM in the CPU is valid, the EPROM is not mounted.

(3) Resident RAM

RAM capacity	512k bytes (1M x 4 bits D-RAM one piece)
RAM type	4M bits (1M x 4 bits)
Access time	70 ns

The block diagram of CPU and memory circuit is shown in Fig. 3-2.

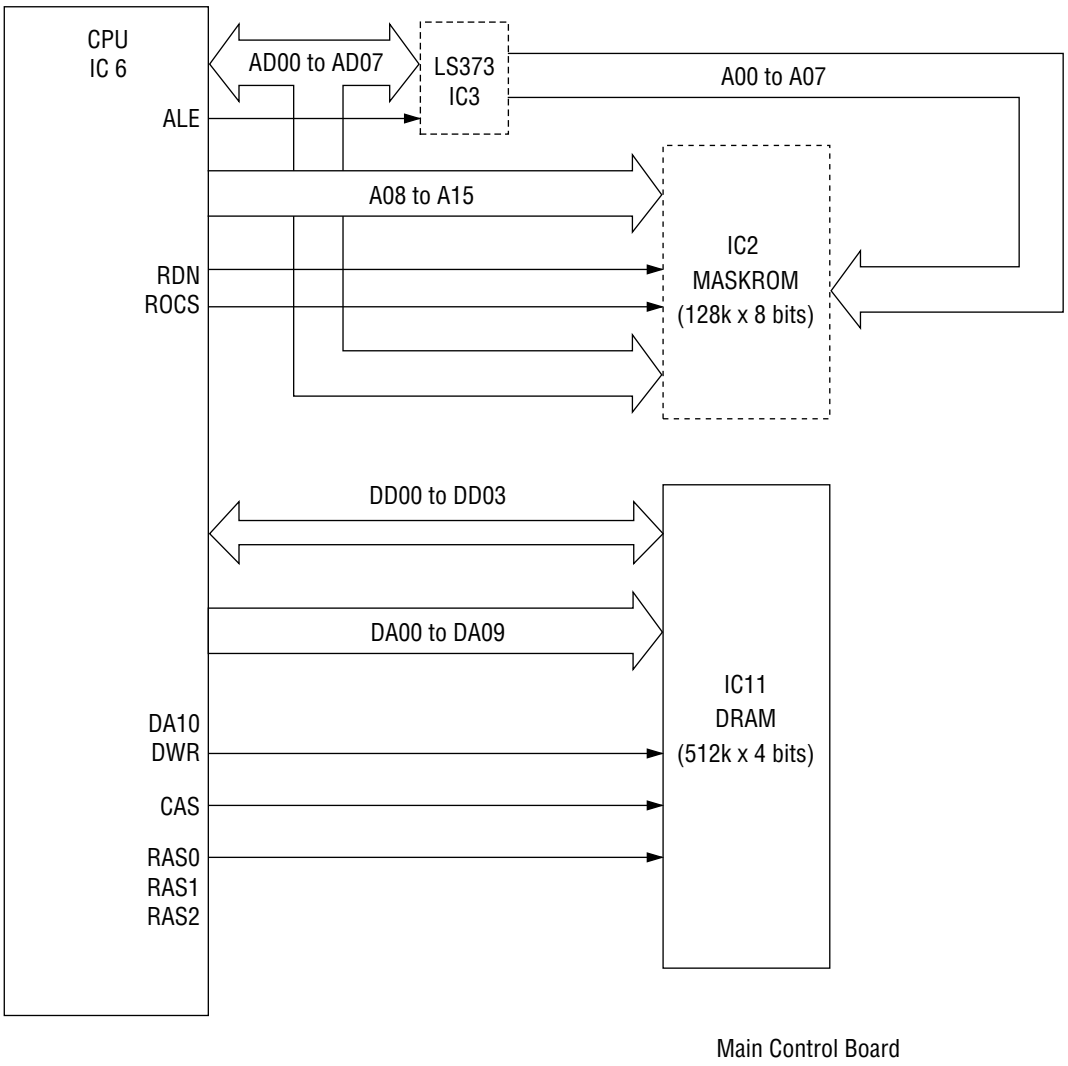
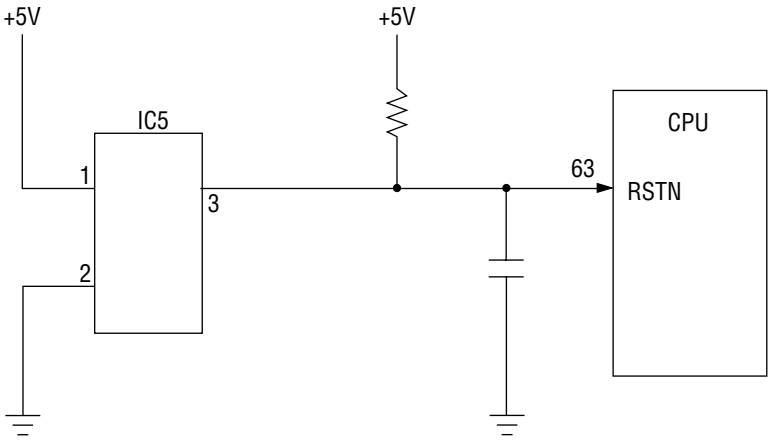
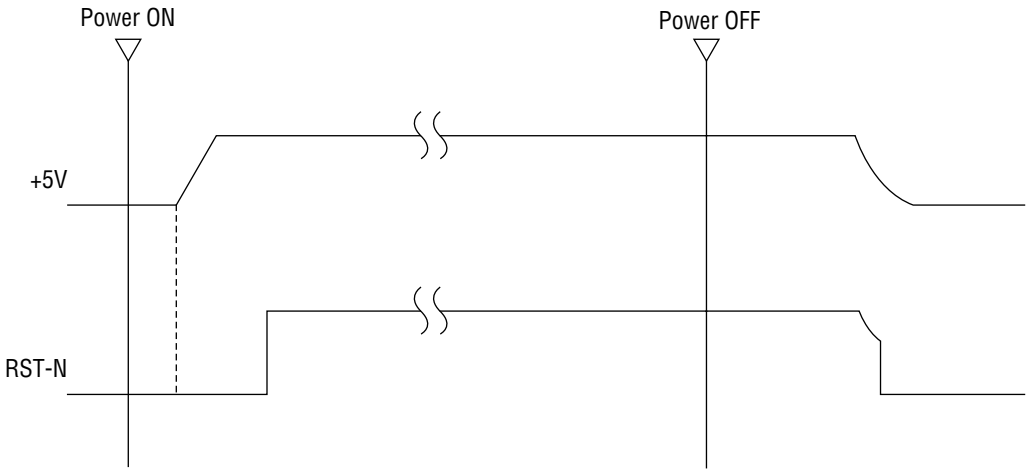


Figure 3-2 Block Diagram of CPU & Memory in OKIPAGE4m

3.3 Reset Control

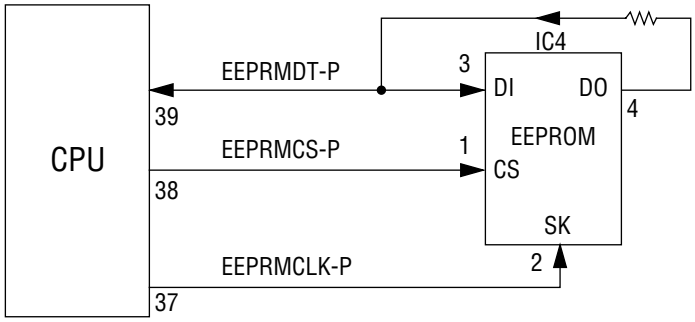
When power is turned on, RST-N signal is generated by IC5.





3.4 EEPROM Control

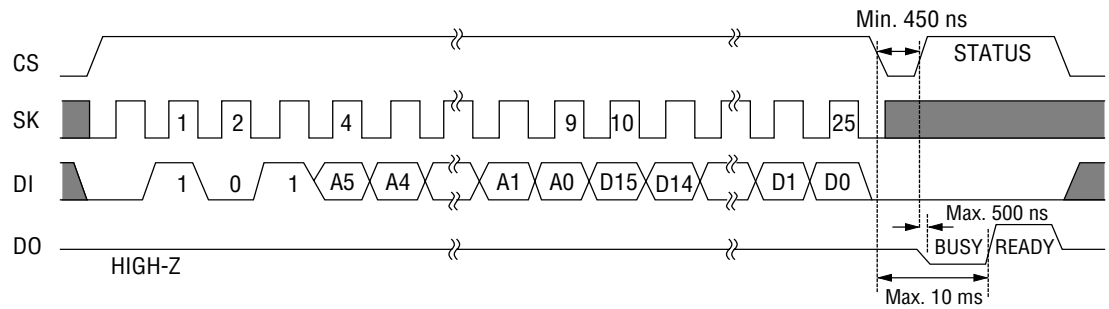
The BR93LC46A on the main control board is an electrical erasable/programmable ROM of 64-bit x 16-bit configuration. Data input to and output from the ROM are bidirectionally transferred in units of 16 bits through I/O port (EEPRMDT-P) in serial transmission synchronized with a clock signal from the CPU.



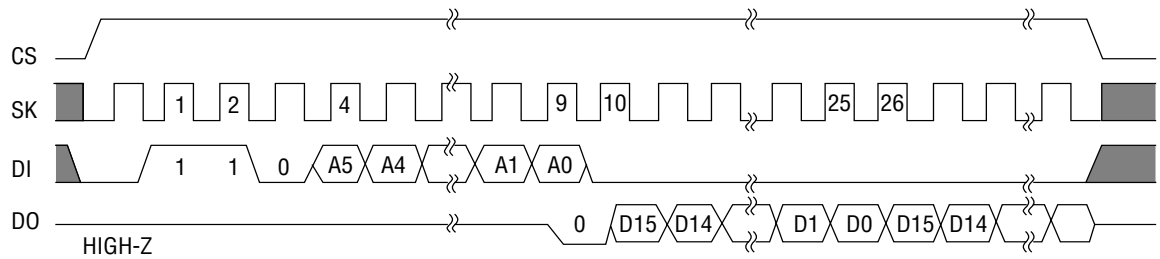
The EEPROM operates in the following instruction modes.

Instruction	Start bit	Operation code	Address	Data
Read (READ)	1	10	A5 to A0	
Write Enabled (WEN)	1	00	11XXXX	
Write (WRITE)	1	01	A5 to A0	D15 to D0
Write All Address (WRAL)	1	00	01XXXX	D15 to D0
Write Disabled (WDS)	1	00	00XXXX	
Erase	1	11	A5 to A0	
Chip Erasable (ERAL)	1	00	10XXXX	

Write cycle timing (WRITE)

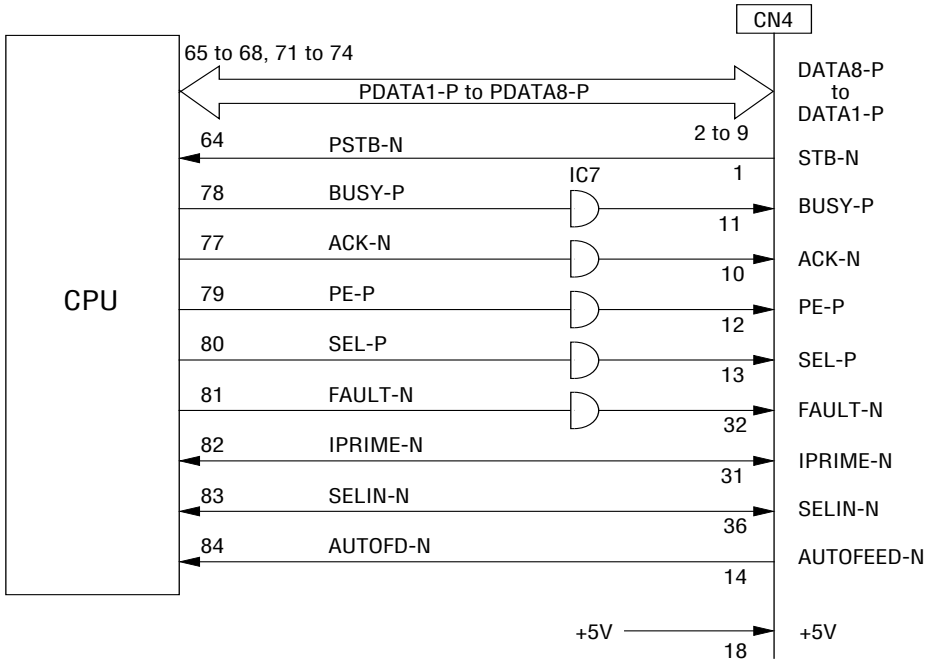


Read cycle timing (READ)



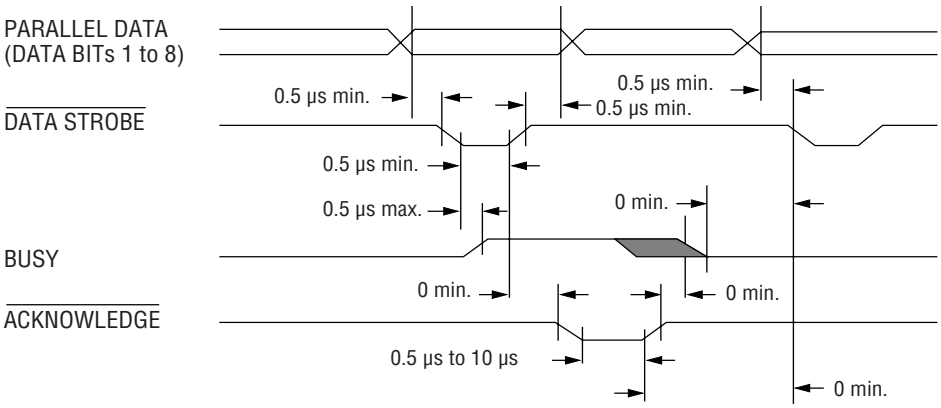
3.5 Parallel Interface

Parallel data is received from a host system via parallel interface which is compliant to the IEEE1284 specification.



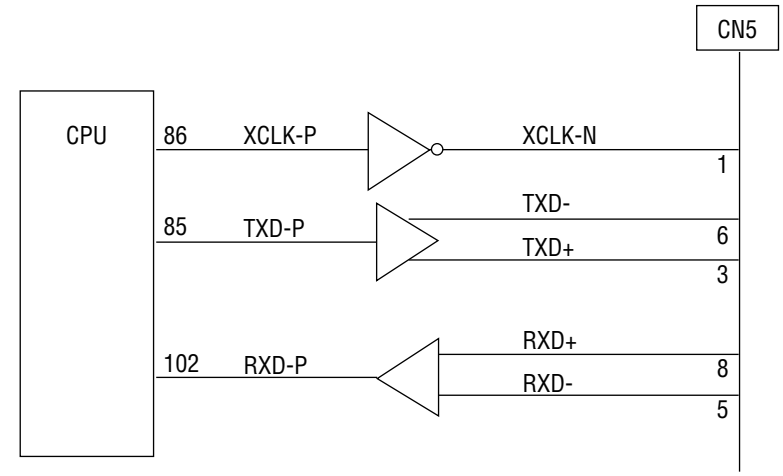
Compatible mode

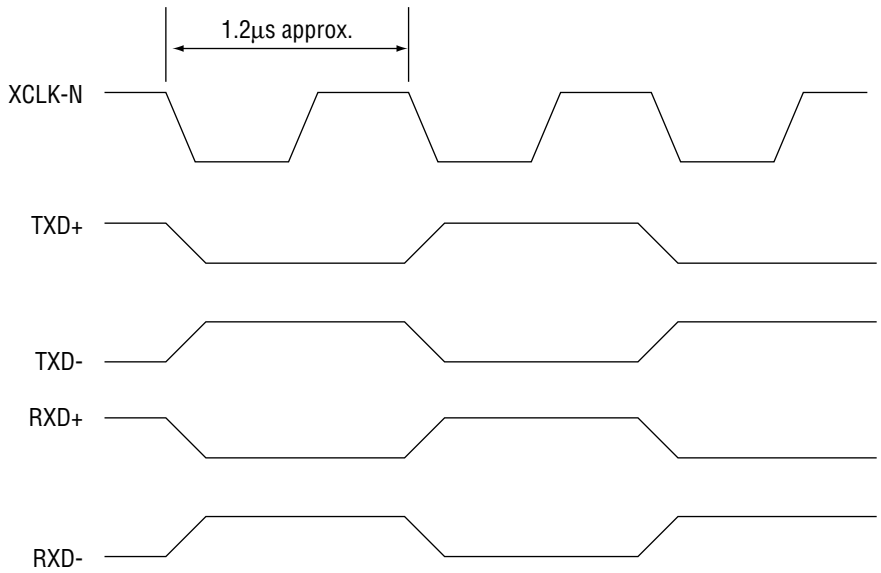
The CPU sets a BUSY-P signal to ON at the same time when it reads the parallel data (PDATA1-P to PDATA 8-P) from the parallel port at the fall of PSTB-N signal. Furthermore, it makes the store processing of received data into a receive buffer terminate within a certain fixed time and outputs an ACK-N signal, setting the BUSY-P signal to OFF.



3.6 Macintosh Interface

Serial data is received from a host system via Macintosh Interface which is compliant to the RS422 specification.

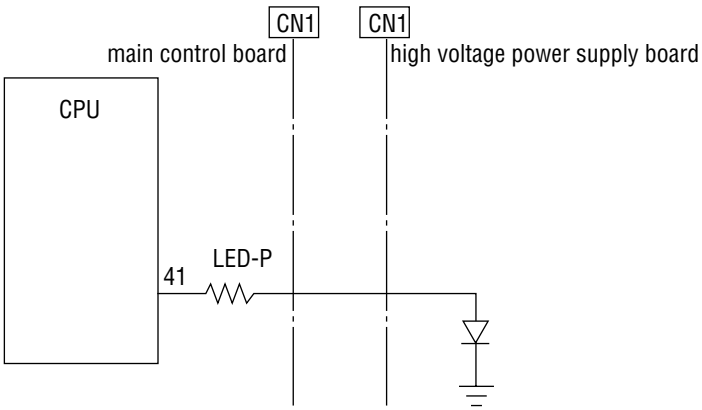




3.7 LED Lamp Control

There is an LED lamp on the high voltage power supply board which is connected to and controled by the CPU on the main control board.

The light from the LED lamp can be seen on the Lens Cover through the LED Lens.



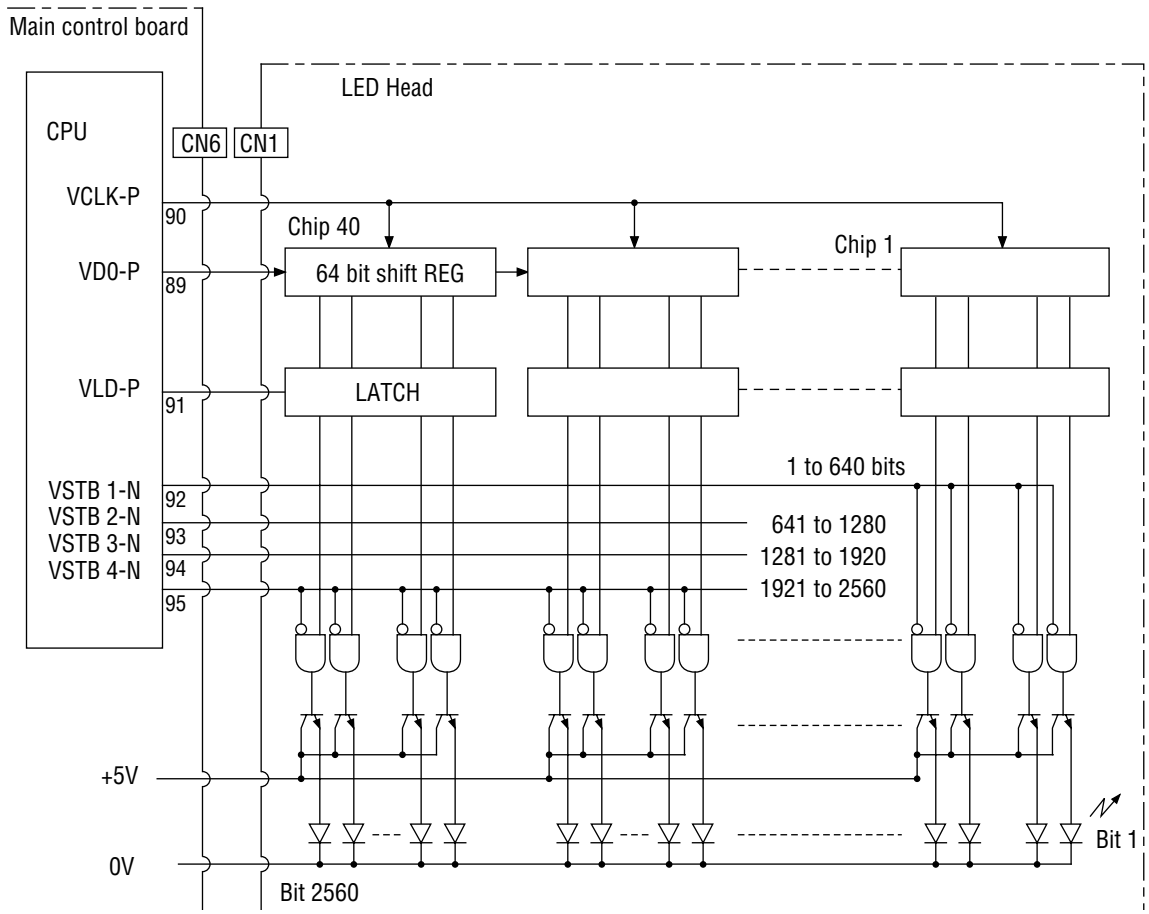
3.8 LED Head Control

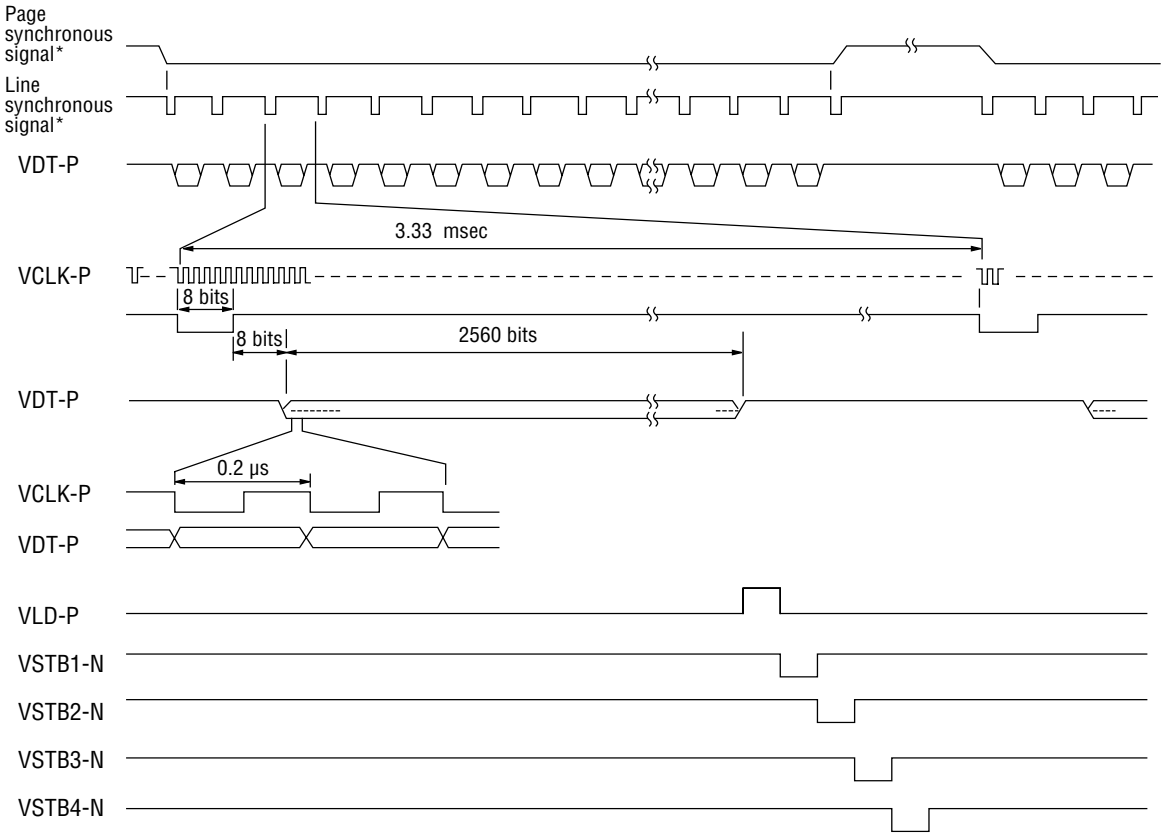
When a paper form is made to arrive at the data write position on print start, the sending of data to the LED head starts as synchronized with the page synchronous signal/line synchronous signal (CPU internal signal).

Bit image data developed on the raster buffer in the CPU are DMA-transferred to the register of a video interface controller (CPU built-in) and then sent to the shift register of the LED head in a serial transmission synchronized with the VCLK-P signal by the VD0-P signal.

When 1-dot line data (2560 bits) is completely shifted, it is latched by means of the VLD-P signal, causing LEDs to be driven by the VSTB1-N through VSTB4-N signals in different timing for each signal.

Some of LED heads have 2496 dots rather than 2560 dots. The controls regarding the number of dots are adjusted to the LED head installed when the printer is shipped from the factory.

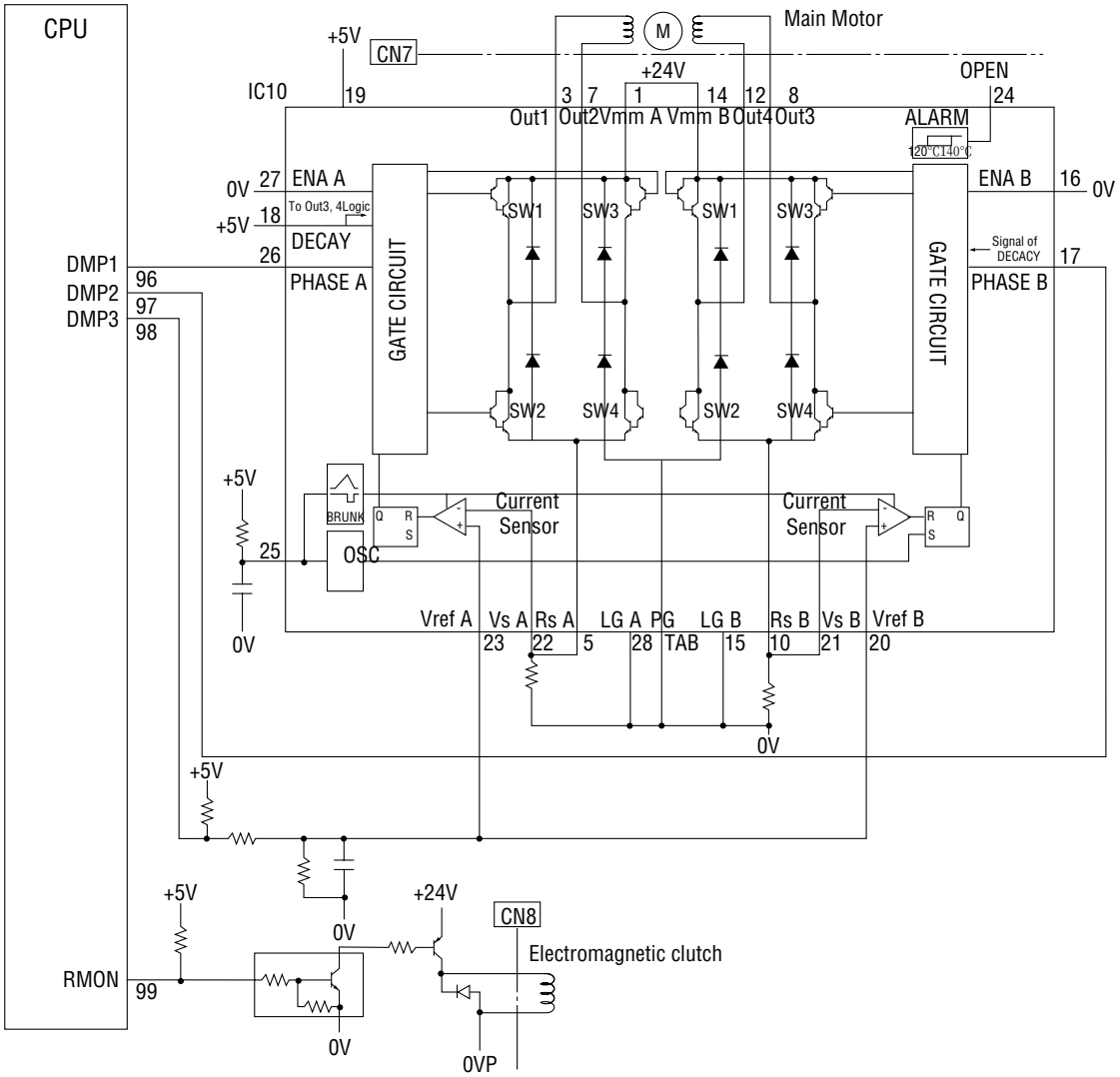




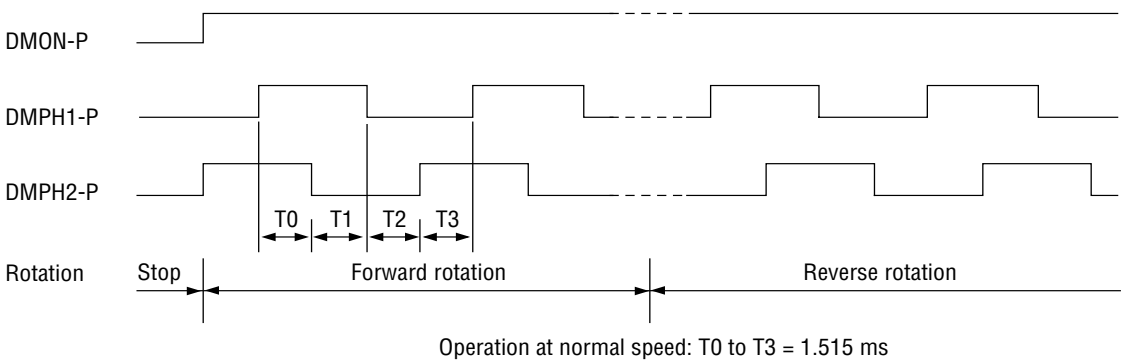
* CPU internal signal

3.9 Motor and clutch control

The electromagnetic clutch is driven by a control signal from the CPU and the drive circuit shown below.
The main motor is driven by the control signals from the CPU and the driver IC.



(1) Main motor



Operation at normal speed: T0 to T3 = 1.515 ms

(2) Motor drive control

Time T0 to T3 determines the motor speed, while the phase different direction between phase signals DMPH1-P and DMPH2-P determines the rotation direction. DMON-P signal control a motor coil current. According to the polarity of the phase signal, the coil current flow as follows:

1) +24V → SW1 → motor coil → $\overline{SW4}$ → resistor → earth, or,

2) +24V → $\overline{SW3}$ → motor coil → SW2 → resistor → earth

The drop voltage across the resistor is input to comparator, where it is compared with a reference voltage. If an overcurrent flows, a limiter operates to maintain it within a certain fixed current.

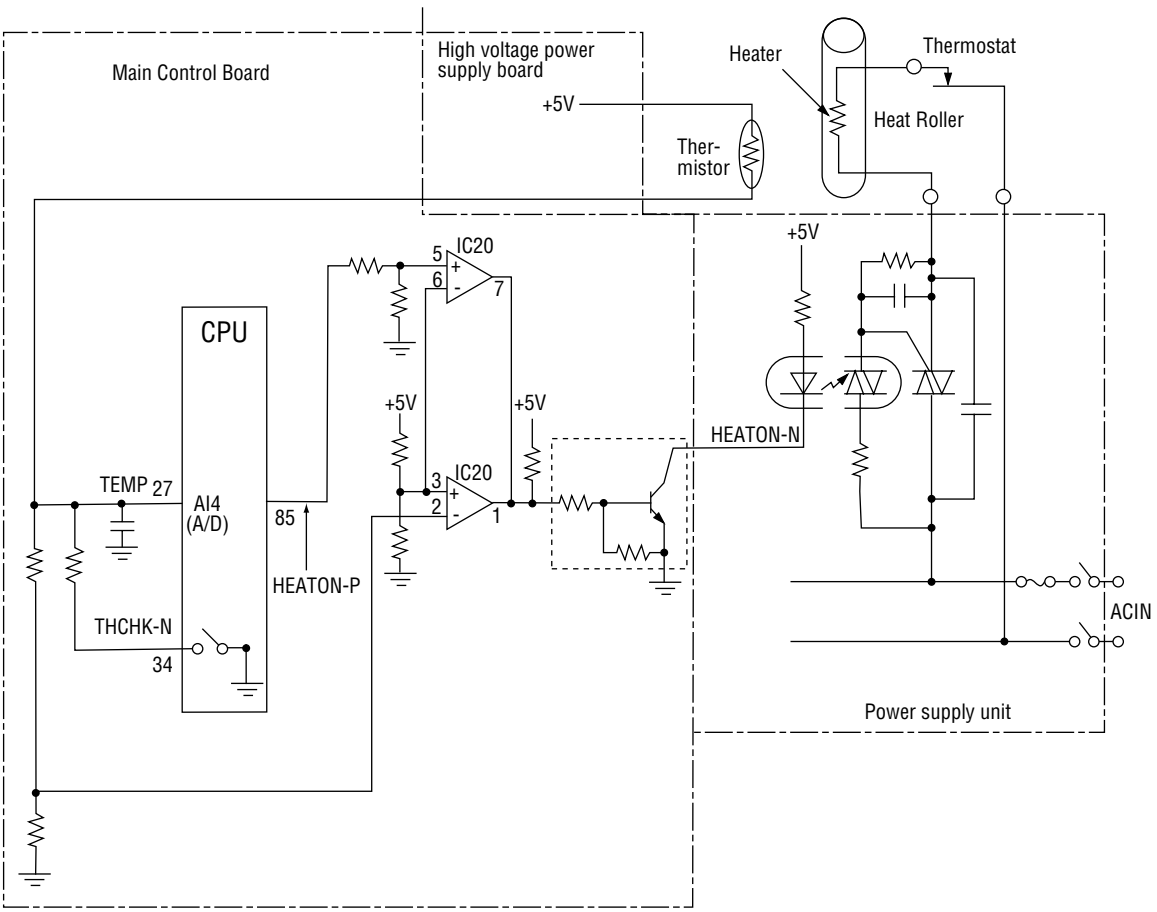
(3) Electromagnetic clutch control

Mechanical operation mode is switched by the combination of the clutch status and the direction of motor rotation.

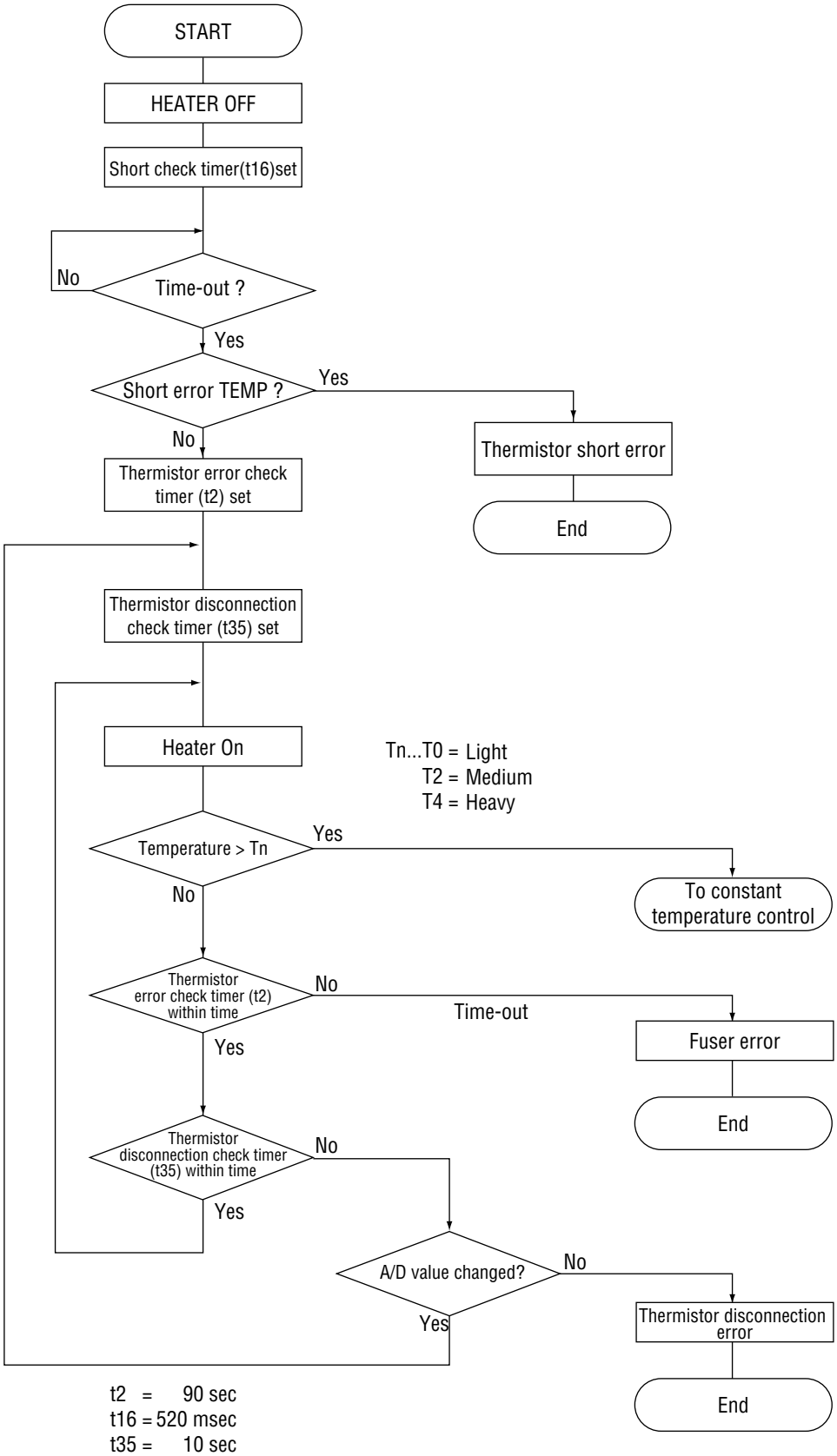
clutch status	rotation direction	operation mode
off	Forward	cleaning
off	Reverse	Hopping from manual feed slot
on	Forward	illegal operation
on	Reverse	Hopping from tray

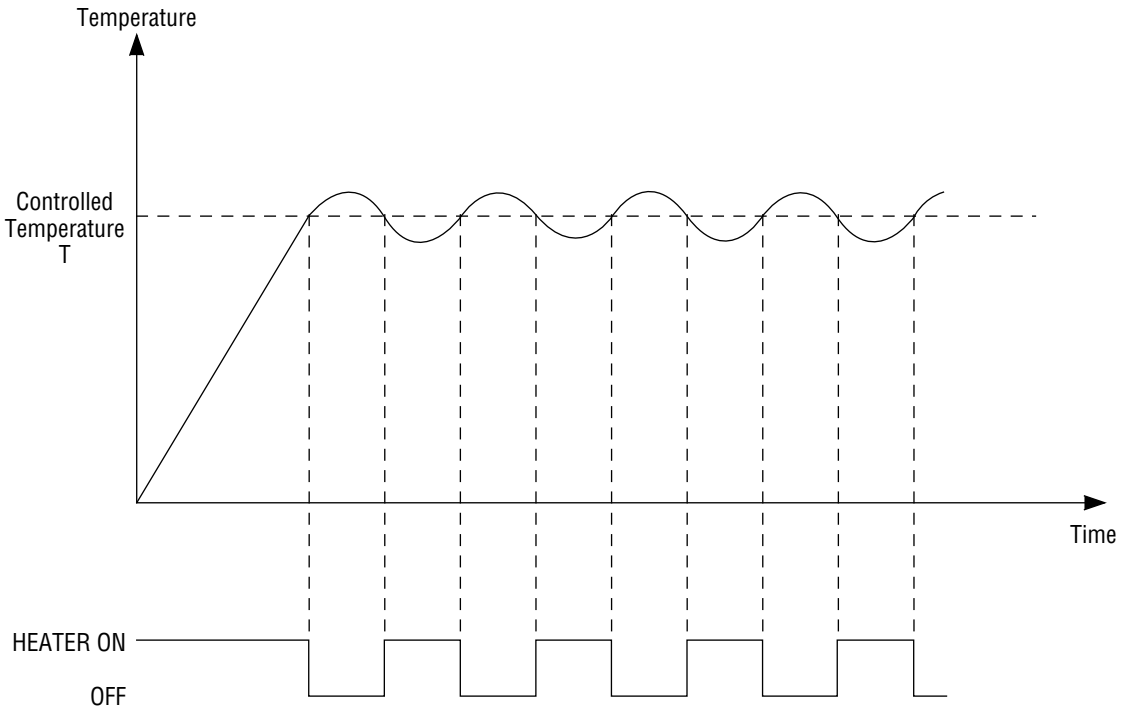
3.10 Fuser Temperature Control

The temperature change in a heat controller is converted into the electric potential TEMP corresponding to the change in the resistance value of a thermistor, and the resultant potential is fed back to the control circuit. The CPU performs ON/OFF control of the HEATON-P signal to keep the heat roller temperature constant in accordance with the state at which the thermistor voltage (TEMP) is read into directly by the AD converter of the CPU.
THCHK-N signal is fixed to “0”.
When the paper thickness is set on the menu of the host, the temperature is adjusted to the targeted thickness accordingly.



Flowchart of Thermistor Circuit Check





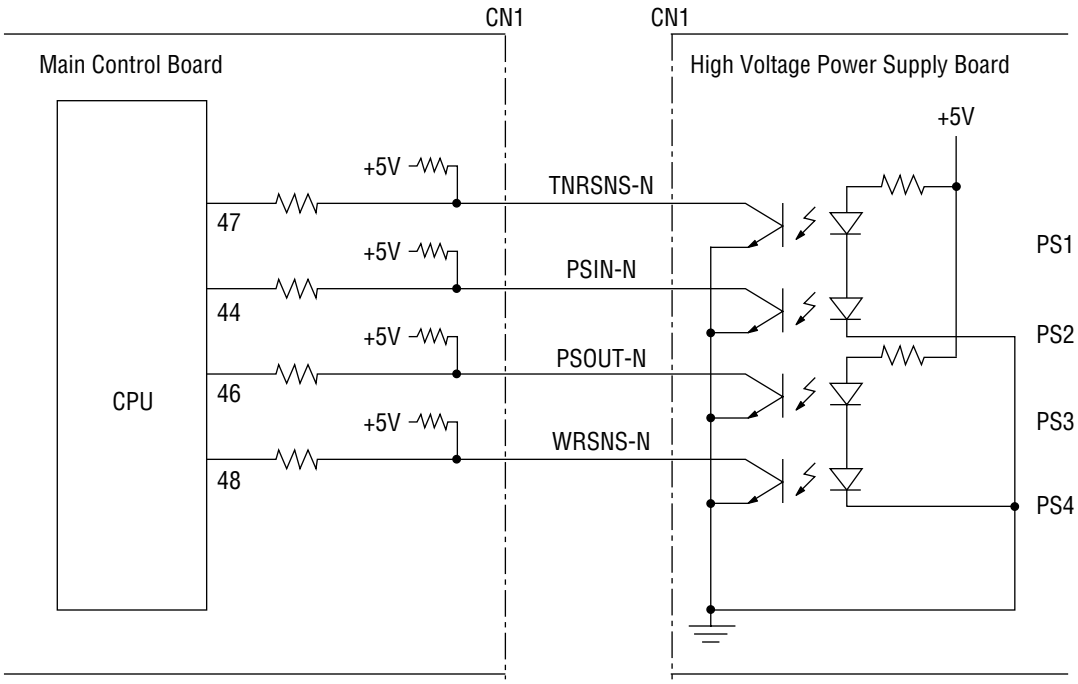
Temperature table

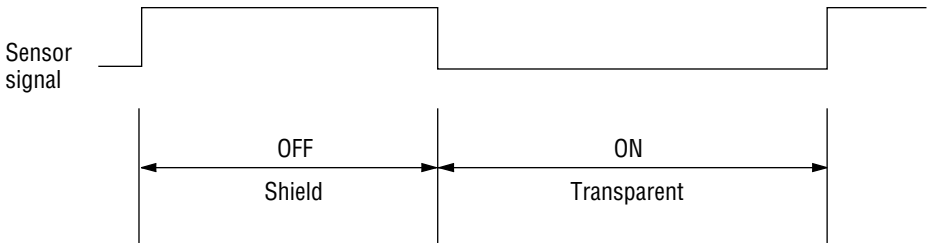
THCHK-N	Heater control mode
O	Normal operation
Z	Not used

T Paper Thickness
145˚C: light
150˚C: medium light
155˚C: medium
160˚C: medium heavy
165˚C: heavy

3.11 Sensor Control

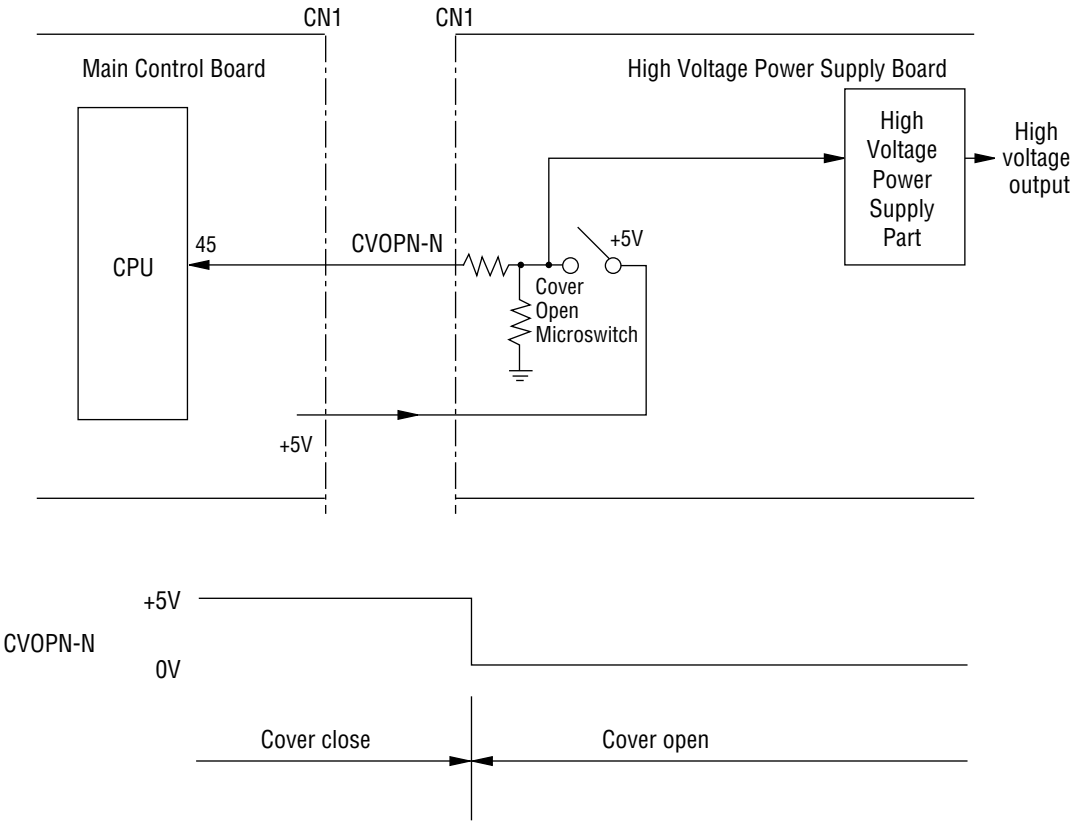
The CPU supervises the state of each sensor every 40 ms.





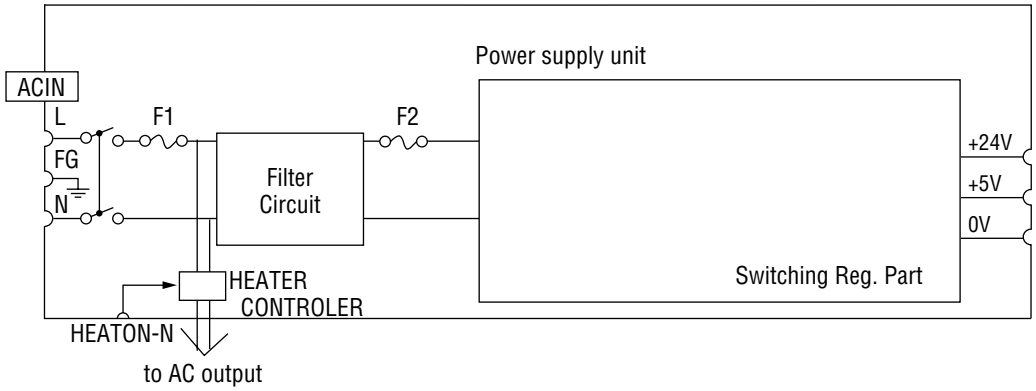
3.12 Cover Open

When the cover is opened, a cover open microswitch is opened. This makes a CVOPN-N signal low, thereby the CPU detects that cover is open. Furthermore, opening the cover stops applying a +5V power to the high voltage power supply part, resulting in stopping all high voltage outputs.



3.13 Power Supply Part

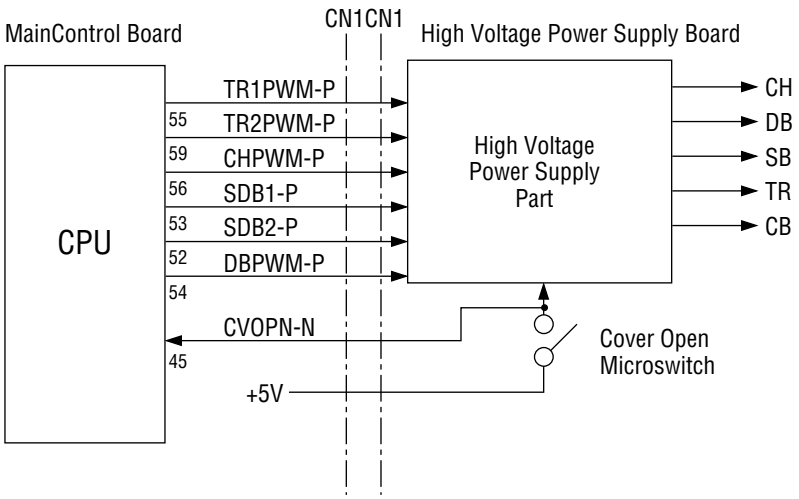
(1) Power supply unit
An AC power from an inlet is input to Switching Reg. part .AC power is converted to a +24 VDC output and +5 VDC output.



Fuse Ratings

AC Input / Fuse	230 V	120 V
F1	250 V 6.3 A	125 V 10 A
F2	250 V 2 A	250 V 2 A

(2) High voltage power supply board
The +5 VDC power supplied to the high voltage power supply part via the cover open microswitch as source voltage. The high voltage power supply part supplies necessary voltage for electro-photography print to output terminals CH, DB, SB, TR, and CB according to a control signal from the CPU. The table on the next page shows the relationship between control signals and high voltage outputs.



Control Signals and High Voltage Outputs

Control signal name	Level	Function
TR1PWM-P	H/L (PWM)	Makes the part put out a power (+3 to 5 μA / +0.5 to 4 KV) to TR.
	L	———
TR2PWM-P	H/L(PWM)	Makes the part put out a -750V power to TR.
	L	———
CHPWM-P	H/L(PWM)	Makes the part put out a -1.35 KV power to CH.
	L	———
SDB1-P	H	Makes the part put out the following power: +450V or 0V power to SB +300V power to DB
	L	———
SDB2-P	H	Makes the part put out the following power: -450V power to SB -300V power to DB +400V power to CB
	L	———
DBPWM-P	H/L(PWM)	Makes the part put out the power to SB, DB, CB.
	L	———

4. TROUBLESHOOTING

4.1 Troubleshooting Table

(A) High Voltage Power Supply Board

Note: A malfunction of the power supply is not repaired by an agency. The abnormality to be treated here is that of sensors only.

Failure	PC Display Message	Flowchart No.
A paper input jams occur frequently.	PAPER INPUT JAM	A - 1
A paper feed jams occur frequently.	PAPER FEED JAM	A - 2
A paper-exit jams occur frequently.	PAPER EXIT JAM	A - 3
A paper size errors occur frequently.	PAPER SIZE ERROR	A - 4
Paper can not be fed from the manual feed slot .		A - 5
The message "COVER OPEN" remains displayed on the PC display.	COVER OPEN	A - 6
The message "TONERLOW" remains displayed on the PC display.	TONER LOW	A - 7
The message "TONERSNS" remains displayed on the PC display.	TONER SENSOR	A - 8

(B) Main Control Board

Failure	PC Display Message	Flowchart No.
Initialization error and not restored	INITIALIZATION ERROR	B - 1
Program ROM error	ROM CHECK ERROR	B - 2
Resident RAM error	RAM CHECK ERROR	B - 3
EEPROM error	EEPROM CHECK ERROR	B - 4
Fuser error	FUSER ERROR	B - 5
Watchdog timer timeout occurs frequently.	WATCHDOG TIMER ERROR	B - 6
Data sent through the Parallel I/F cannot be received.	INITIALIZATION ERROR	B - 7
Data sent through the Macintosh I/F cannot be received.	INITIALIZATION ERROR	B - 8

4.2 Troubleshooting Flowchart

A-1 Paper input jams occur frequently.

- Is PS4 (Write Sensor) operating normally?
  - No Replace PS4.
- Yes Is Pin1 of CN8 in main control board operating normally?
  - No Replace Q4 or Q5 in main control board.
- Yes Failure of IC6 (MSM65917) in main control board.

A-2 A paper feed jams occur frequently.

- Is PS4 (Write Sensor) operating normally?
  - No Replace PS4.
- Yes Is PS3 (Outlet Sensor) operating normally?
  - No Replace PS3.
- Yes Failure of IC6 (MSM65917) in main control board.

A-3 A paper exit jams occur frequently.

- Is PS3 (Outlet Sensor) operating normally?
  - No Replace PS3.
- Yes Failure of IC6 (MSM65917) in main control board.

A-4 A paper size errors occur frequently.

- Is PS4 (Write Sensor) operating normally?
  - No Replace PS4.
- Yes Failure of IC6 (MSM65917) in main control board.

A-5 Paper can not be fed from manual feed slot.

- Is PS2 (Manual Feed Sensor) operating normally?
  - No Replace PS2.
- Yes Failure of IC6 (MSM65917) in main control board.

A-6 The message “COVER OPEN” remains displayed on the PC display.

- Is CVSW (Cover Open Switch) operating normally?
  - No Replace CVSW.
- Yes Failure of IC6 (MSM65917) in main control board.

A-7 The message “TONERLOW” remains displayed on the PC display.

- Is PS1 (Toner Sensor) operating normally?
  - No Replace PS1.
- Yes Failure of IC6 (MSM65917) in main control board.

A-8 The message “TONERSNS” remains displayed on the PC display.

- Is PS1 (Toner Sensor) operating normally?
  - No Replace PS1.
- Yes Failure of IC6 (MSM65917) in main control board.

B-1 Initialization error and not restored

- Replace IC2.
- OK?
- No — Is the 10-MHz clock signal being put out to pin 3 of OCS1?
  - No — Replace OSC1 (CST 10.0MTW).
- Yes — Failure of IC6 (MSM65917)

B-2 Program ROM error

- Replace IC2.

B-3 Resident RAM error

- Are negative pulses being put out to Pin 4 , 23 (RAS0-N , CSA-N) of IC11?
  - No — Failure of IC6 (MSM65917)
- Yes — Are the signals at pins, 9 TO 12 , 14 TO 18 , 5 (DA00-P to DA09-P) of IC11 being changed?
  - No — Failure of IC6 (MSM65917)
- Yes — Replace IC11.

B-4 EEPROM error

- Replace IC4.
- OK?
- No — Failure of IC6 (MSM65917)

B-5 Fuser error

- Is the heater on?
  - No — Is the voltage at Pin 40 (HEATON-P) of IC6(MSM65917) 5V?
    - Yes — Replace Q3 or IC20
- No — Failure of IC6 (MSM65917)

B-6 Watchdog timer timeout occurs frequently.

- Replace IC2.
- OK?
- No — Failure of IC6 (MSM65917)

B-7 Data sent through the Parallel I/F cannot be received.

- Is the signal at Pin 11 (BUSY-P) of CN4 being at low level?
  - No Is the signal at Pin 13 (BUSY-P) of IC7 (7407) changed as shown below, at data reception?

	ON-LINE	OFF-LINE
BUSY-P	Low	High

    - No Failure of IC6 (MSM65917)
  - Yes Replace IC7 (7407).
- Yes Is the level of the signal at Pin 1 (STB-N) of CN4 changed at data reception?
  - No Make sure of the connection of I/F cable or the operation of the h ost computer.
- Yes Are the signals at Pin 1 (ACK-N), Pin 9 (FAULT-N) of IC7 (7407) being respectively at low level and high level in on-line mode?
  - No Replace IC7 (7407).
  - OK?
  - No
- Yes Failure of IC6 (MSM65917)

B-8 Data sent through the Macintosh I/F cannot be received.

- Is the signal at Pin 5 of IC9 (7660) -5V?
  - No Replace IC9 (7660)
- Yes Is the signal at Pin 2 , 4 of IC8 (DS8925) being altered?
  - No Replace IC6 (65917)
- Yes Is the signal at the Pin 6 , 13 , 14 , 15 of IC8 (DS8925) being altered?
  - No Replace IC6 (65917)
- Yes Is the signal at Pin 102 of IC6 (65917) being altered?
- No Replace IC6 (65917).

5. CIRCUIT DIAGRAM

Figure 5-1 ~ 5-7 Main Control PCB (HBMC-) Circuit Diagram (Rev. 2)

Figure 5-8 Option RAM PCB (HBRB-) Circuit Diagram (Rev. 1)

Figure 5-9 High voltage Power Supply PCB (OLHV-) Circuit Diagram (Rev.6 ,7)
(TLHV-) Circuit Diagram (Rev.2)

MSM65917 Mode change

SIGNAL	Pin-No	Short-Wire	Tool not connected		Tool connected
			Internal ROM	External ROM	External ROM
OPEN	61	R121	×	×	○
EAN	62	SP1	B Side	A Side	A Side

× --------- Not Mounted (HIGH-LEVEL)
○ --------- MOunted (LOW-LEVEL)

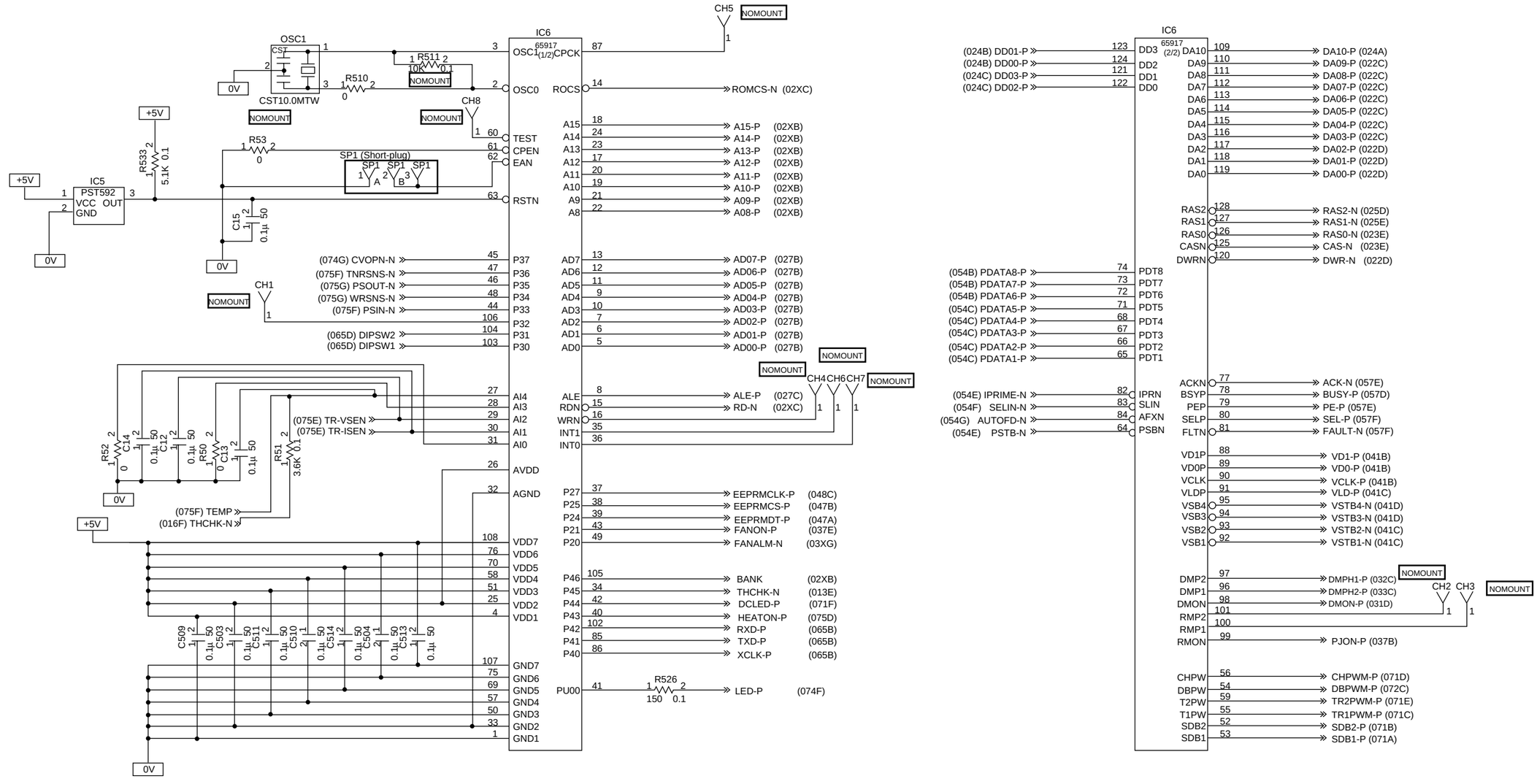


Figure 5-1 Main controller PCB (HBMC-3-1/7) Rev. 2 Cicuit Diagram

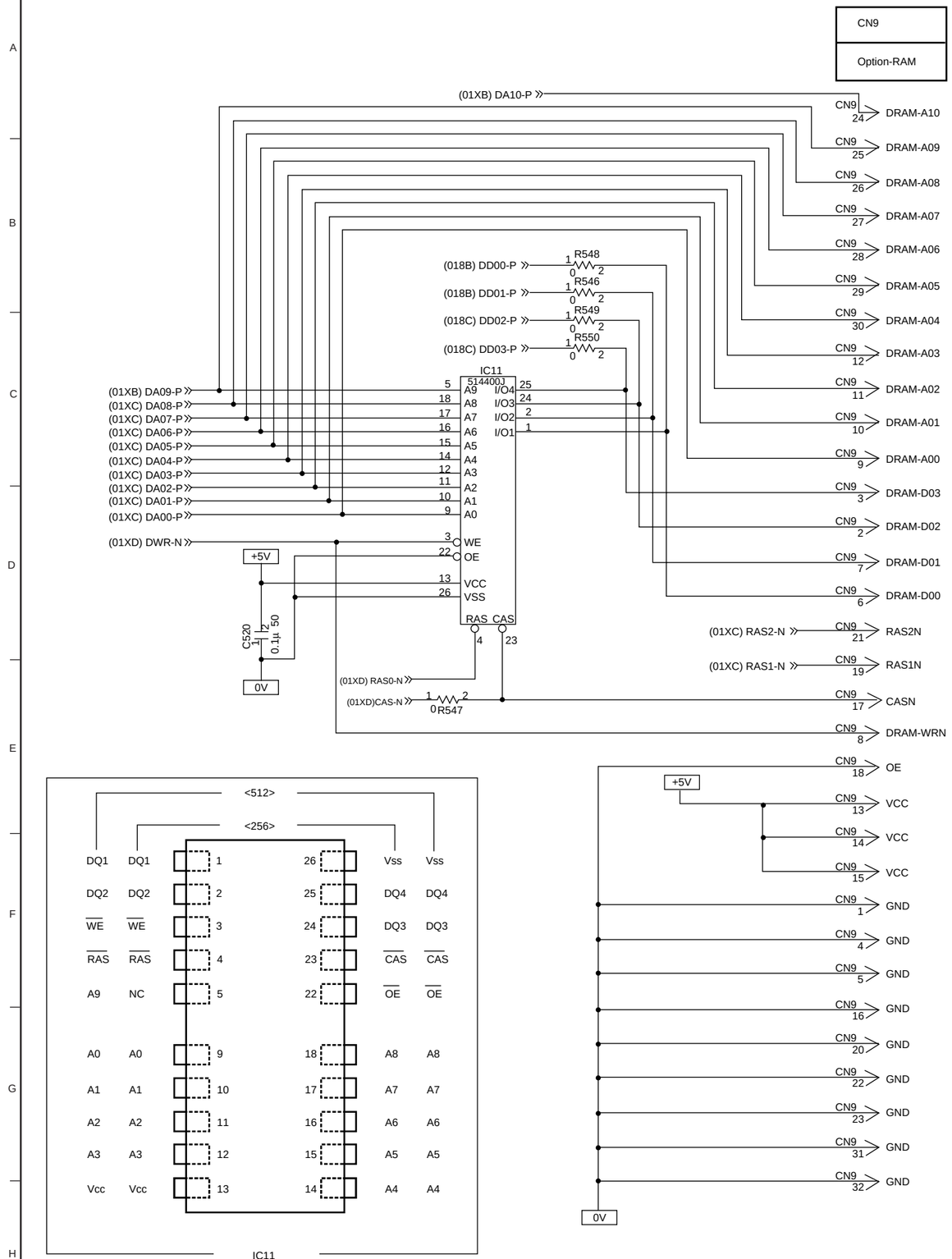


Figure 5-2 Main controller PCB (HBMC-3-2/7) Rev. 2 Cicuit Diagram

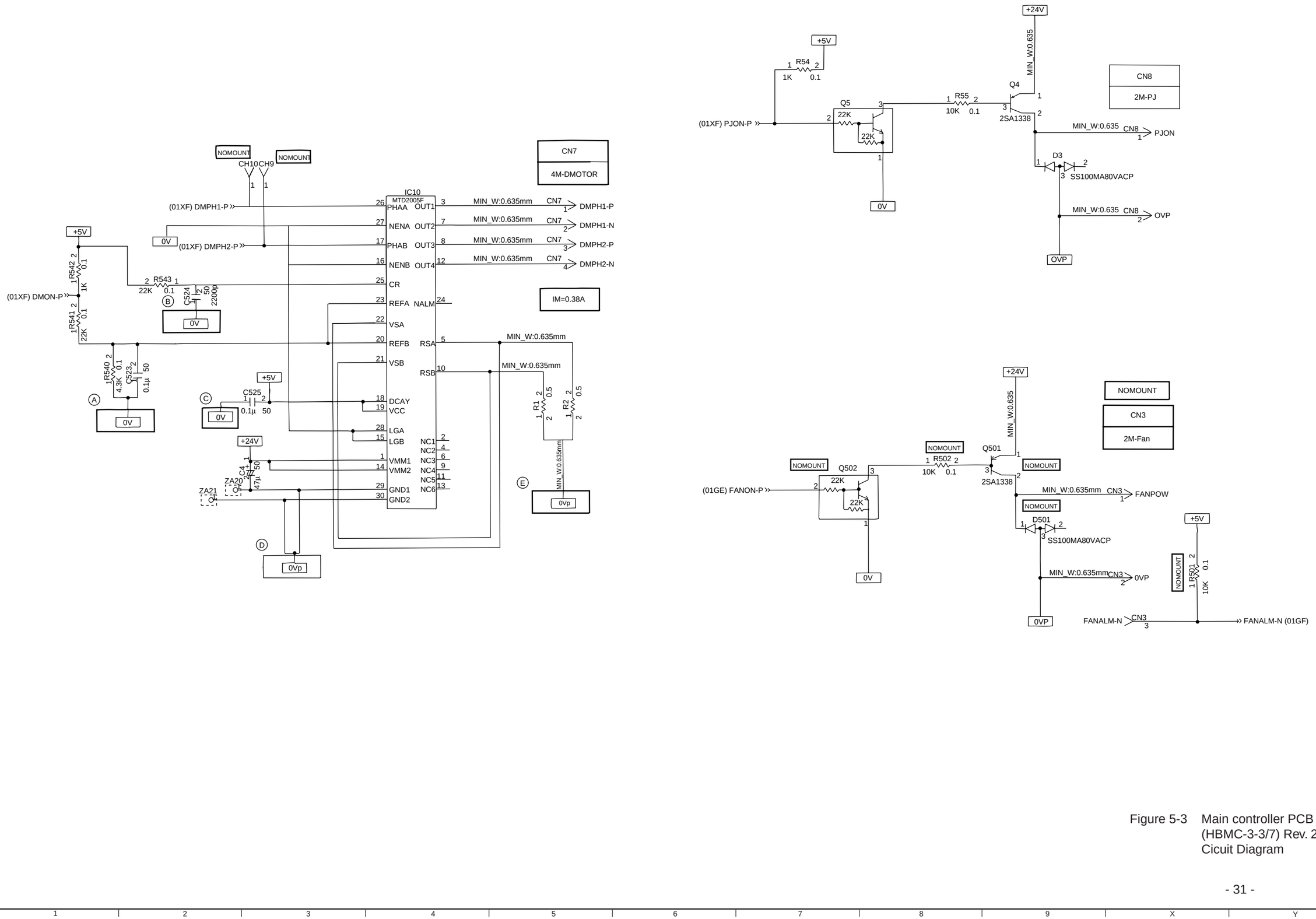
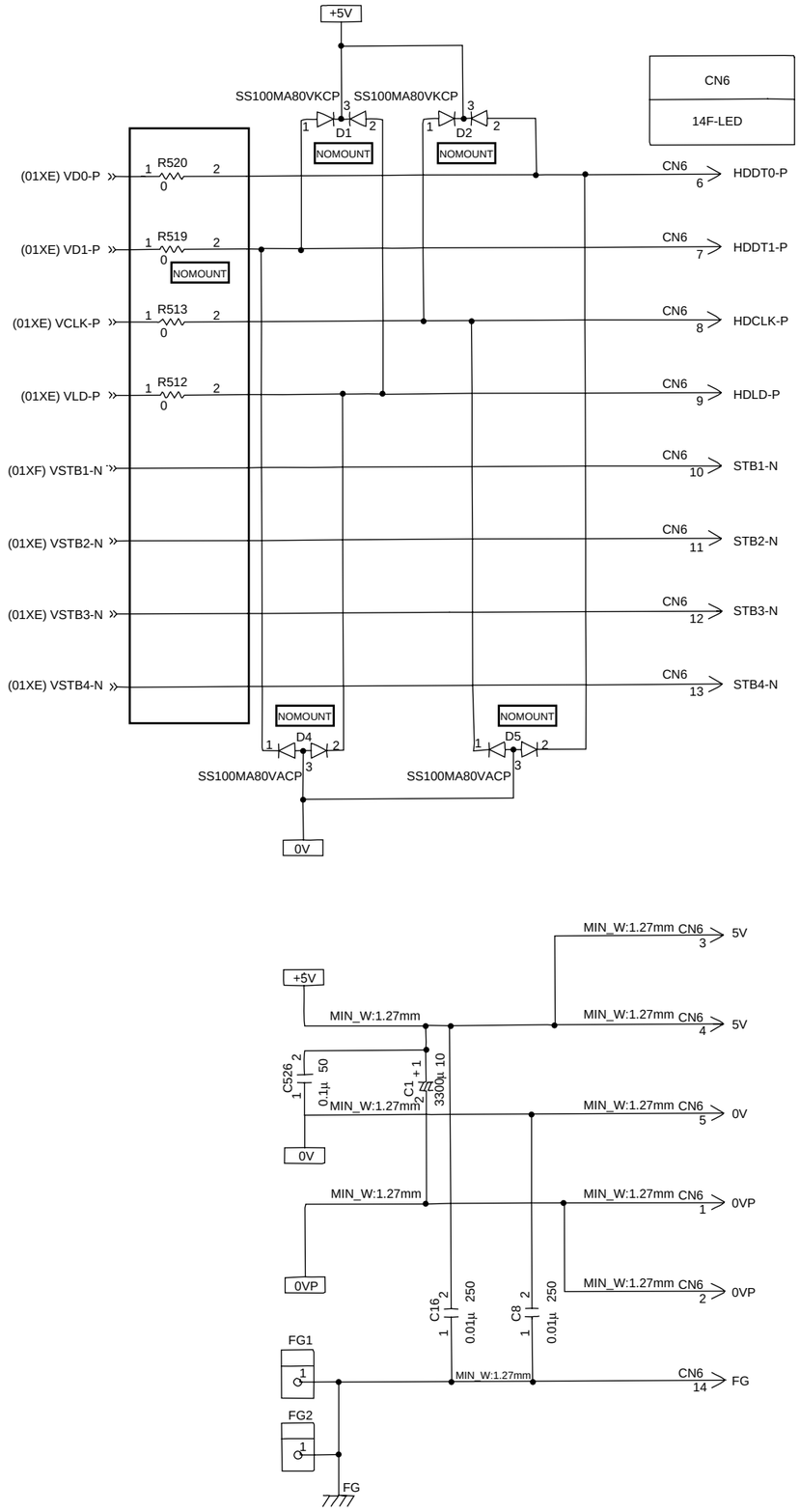


Figure 5-3 Main controller PCB (HBMC-3-3/7) Rev. 2 Cicuit Diagram



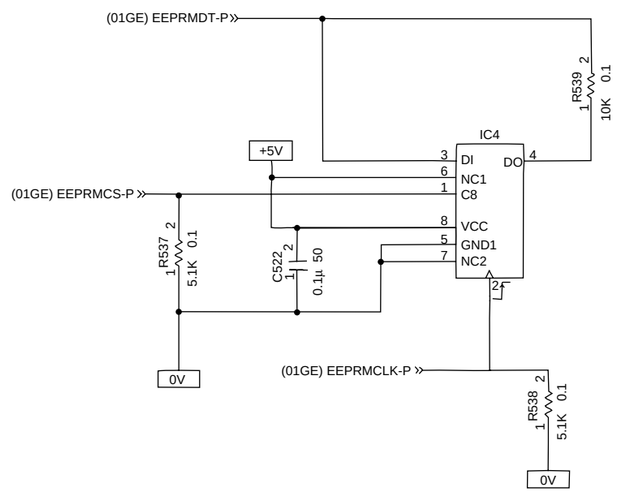


Figure 5-4 Main controller PCB (HBMC-3-4/7) Rev. 2 Cicuit Diagram

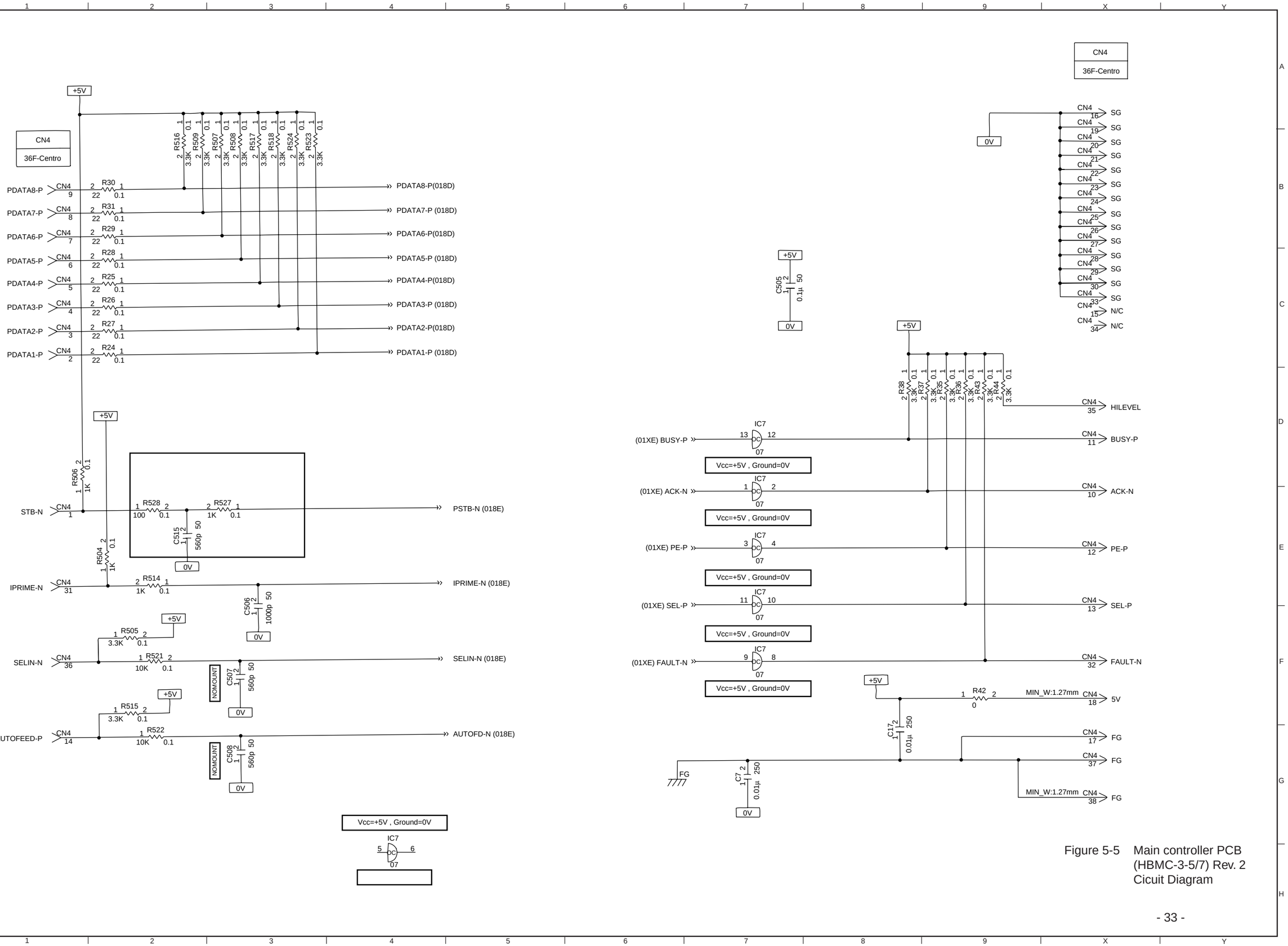


Figure 5-5 Main controller PCB (HBMC-3-5/7) Rev. 2 Cicuit Diagram

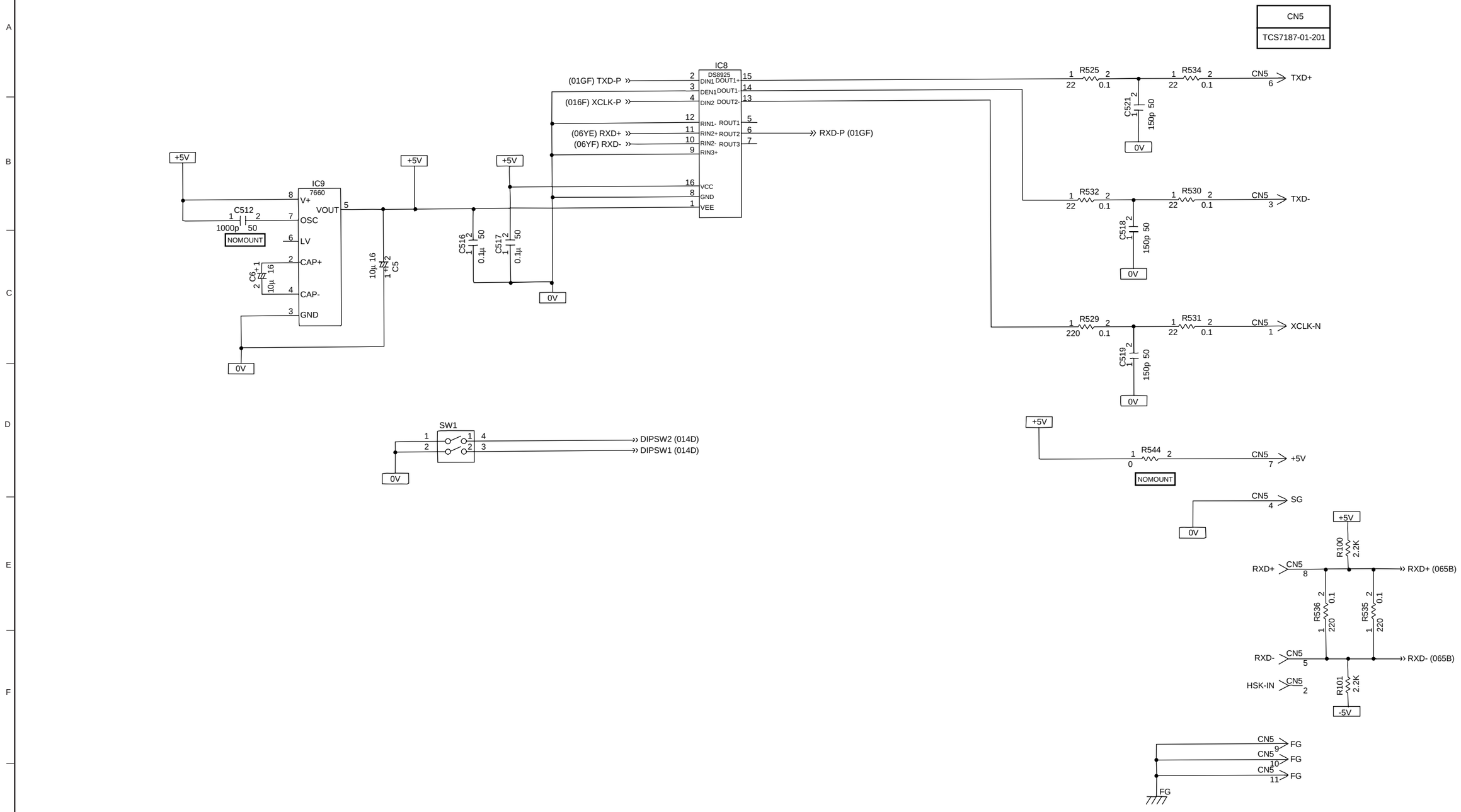


Figure 5-6 Main controller PCB (HBMC-3-6/7) Rev. 2 Cicuit Diagram

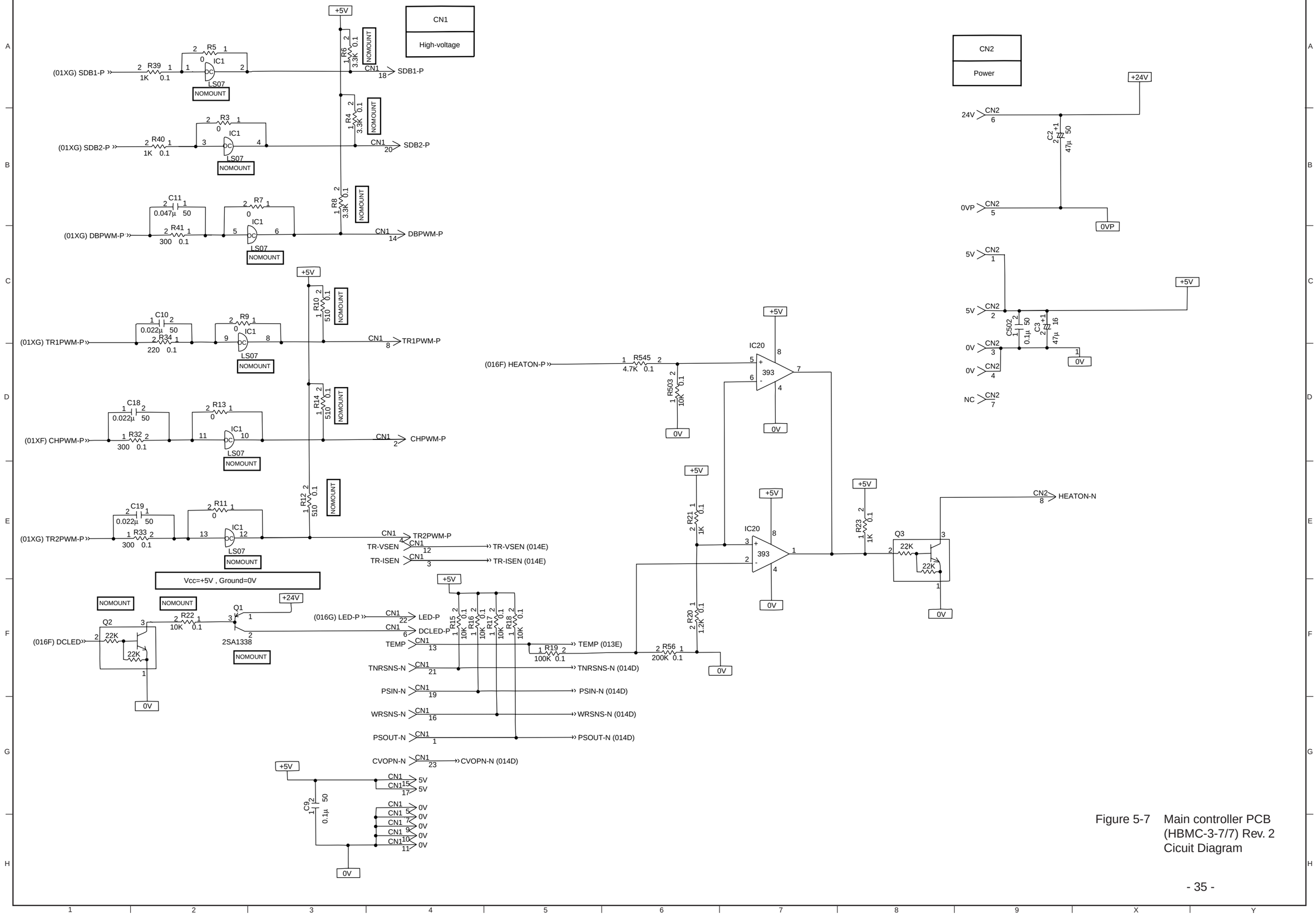


Figure 5-7 Main controller PCB (HBMC-3-7/7) Rev. 2 Cicuit Diagram

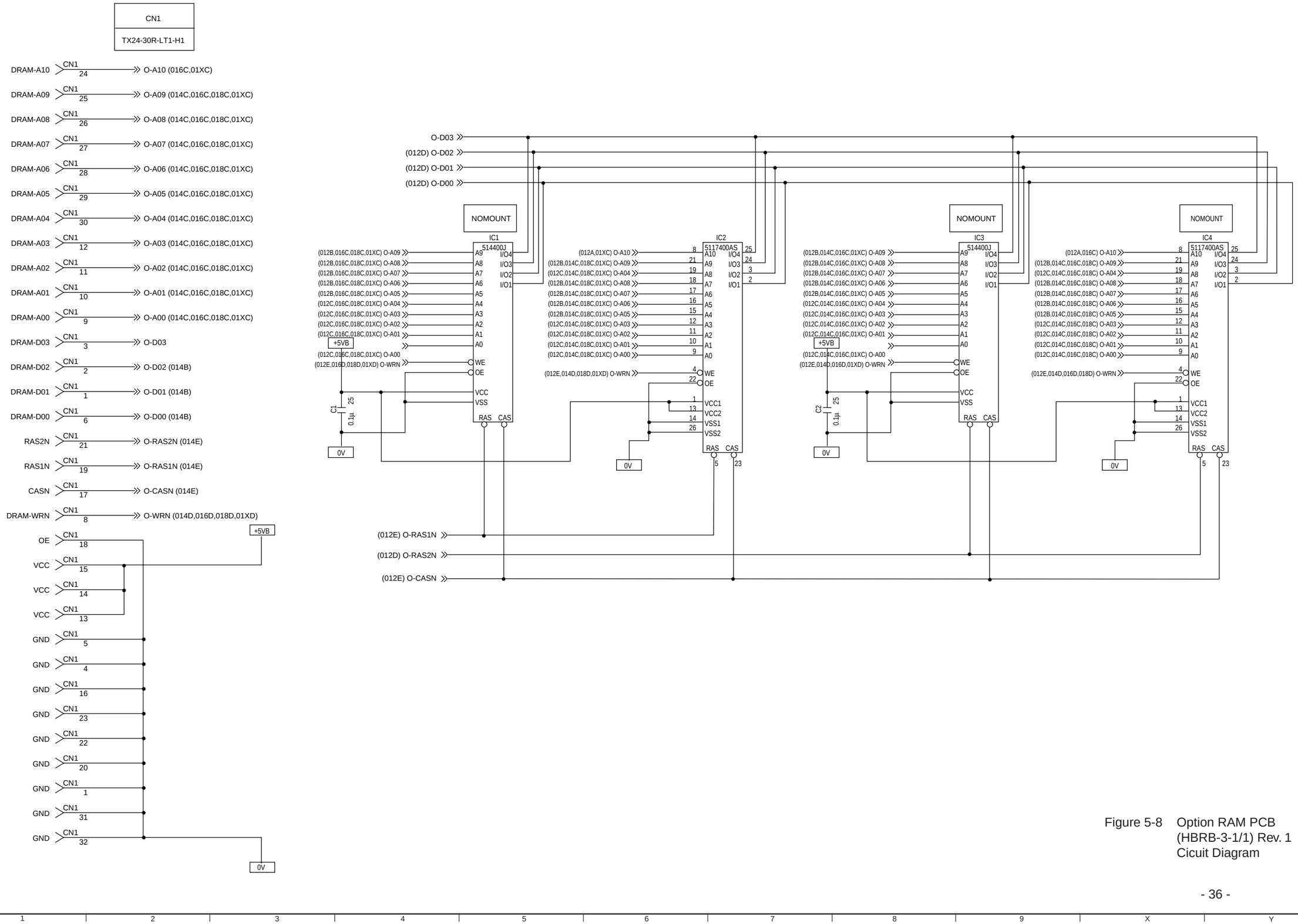


Figure 5-8 Option RAM PCB (HBRB-3-1/1) Rev. 1 Cicuit Diagram

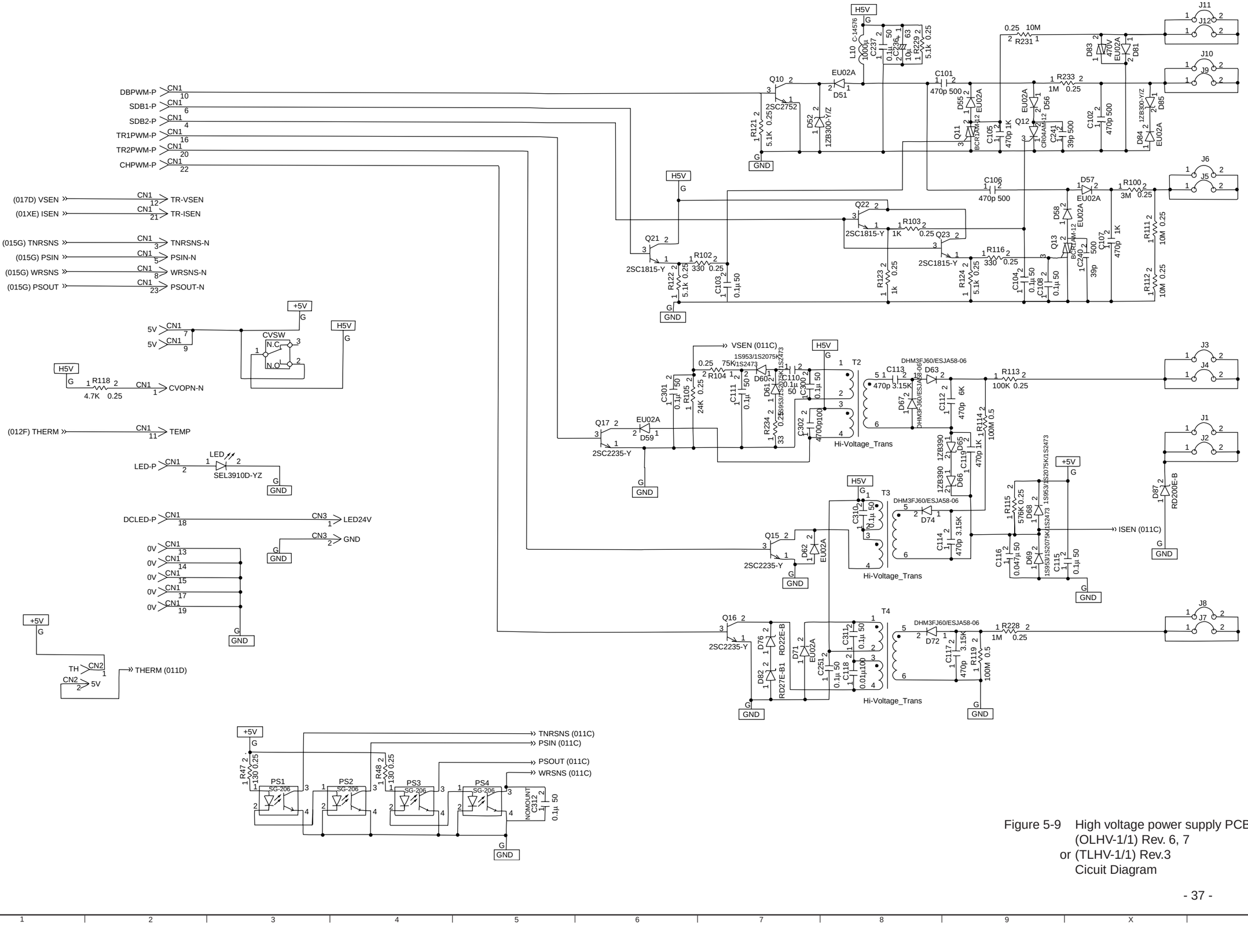
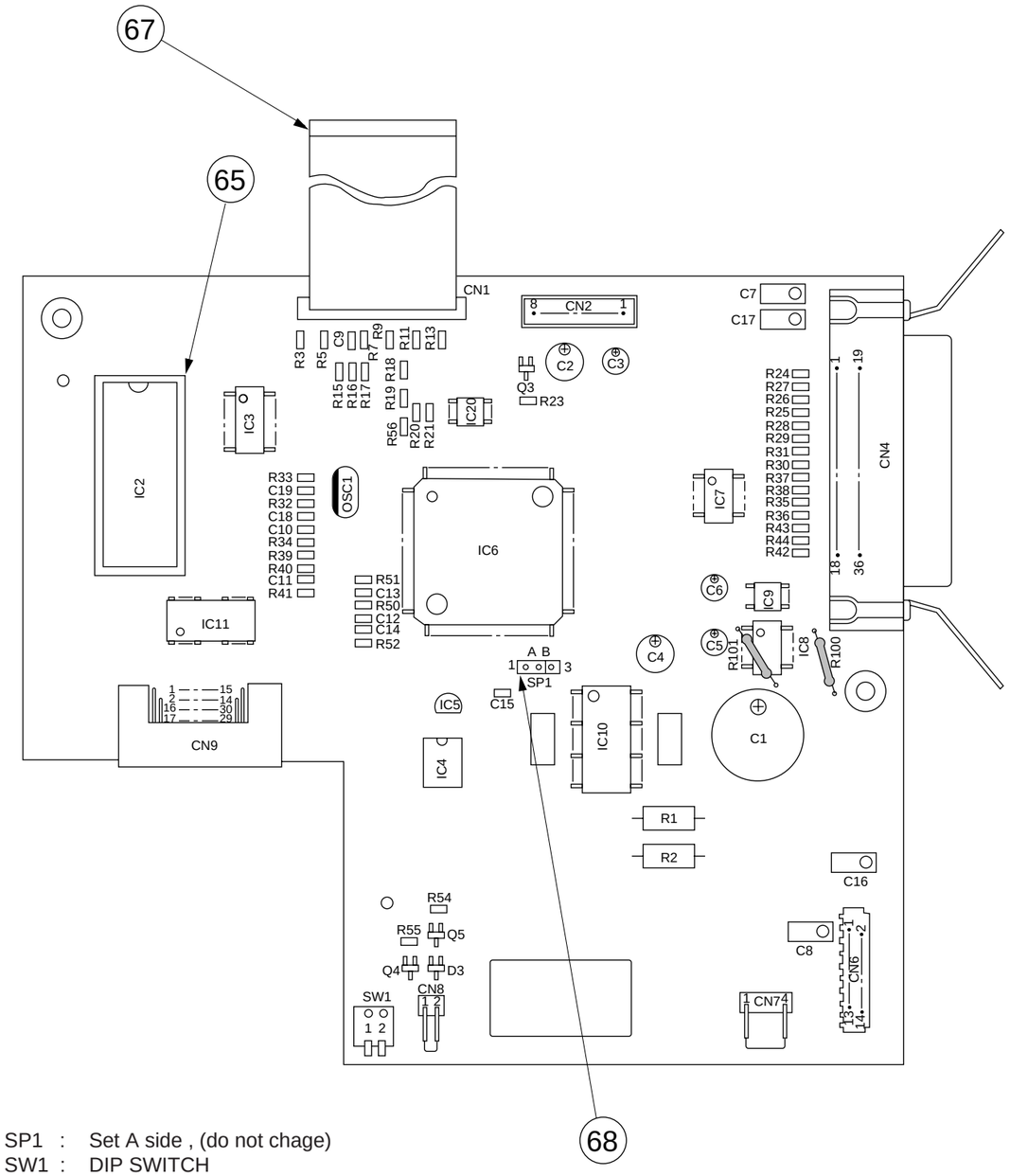


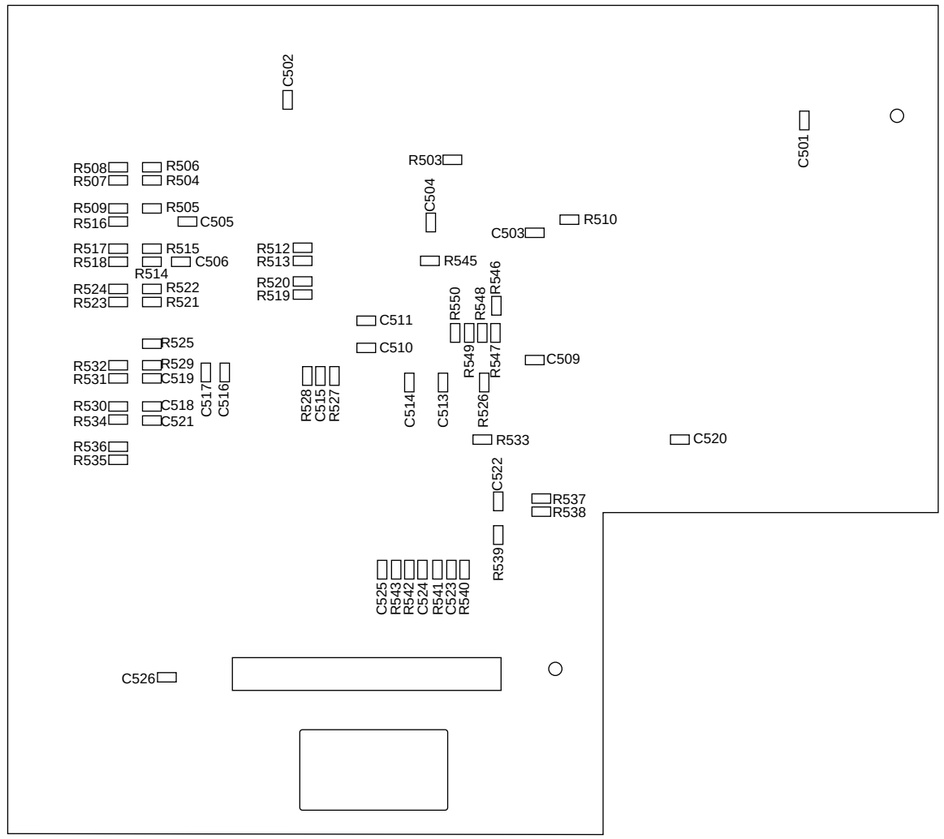
Figure 5-9 High voltage power supply PCB (OLHV-1/1) Rev. 6, 7 or (TLHV-1/1) Rev.3 Cicuit Diagram

COMPONENT PARTS LIST

Drawing List

Main Control Board	(HBMC PCB, Rev. 2)	4YA4121-2516G003
Option RAM Board	(HBRB PCB, Rev. 1)	4YA4121-2502G003
High Voltage Power Supply Board	(OLHV PCB, Rev.7)	4YA4130-1004G1
	or	
	(TLHV PCB, Rev.2)	4YA4130-1024G1





SP1 : Set A side , (do not chage)
SW1 : DIP SWITCH

	Set switch	contents
SW1-1	UP (OFF)	Auto I/F
	DOWN (ON)	conform with SW1-2
SW1-2	UP (OFF)	Parallel I/F
	DOWN (ON)	Macintosh I/F

Set SW1-1 OFF and SW1-2 OFF. (do not change)

HBMC Printed Circuit Board
REV.2
(4YA4121-2516G3-1/2)

HBMC Printed Circuit Board Rev. 2
(4YA4121-2516G3-2/2-1/4)

REF. NO.	SYMBOL	TYPE/NAME	PART NO.	Q'TY	REMARKS
1	D3	SS100MA80VACP DAP202K/1SS181M	611A0000N0001	1	
2	R513,520	RM73B2A331J RES-MET RN	323A5003J0331	2	
3	R55	RM73B2A622J RES-MET RN	323A5003J0622	1	
4	R24-R31,R525, R530-R532,R534	RM73B2A220J RES-MET RN	323A5003J0220	13	
5	R528,R547	RM73B2A101J RES-MET RN	323A5003J0101	2	
6	R526	RM73B2A151J RES-MET RN	323A5003J0151	1	
7	R3,R5,R7,R9,R11,R13,R42, R50,R52,R510,R512, R546,R548-R550	2125JPW RES-MET RN	323A5003P0001	15	
8	R34, R529,R535,R536	RM73B2A221J RES-MET RN	323A5003J0221	4	
9	R32,R33,R41	RM73B2A301J RES-MET RN	323A5003J0301	3	
10	R23,R39,R40,R54,R504 ,R506,R514,R527	RM73B2A102J RES-MET RN	323A5003J0102	8	
11	R533,R537,R538	RM73B2A512J RES-MET RN	323A5003J0512	3	
12	R15-R18,R503,R521, R522,R539	RM73B2A103J RES-MET RN	323A5003J0103	8	
13	R543	RM73B2A223J RES-MET RN	323A5003J0223	1	
14	R19	RM73B2A104F RES-MET RN	323A5003F0104	1	
15	R35-R38,R43,R44, R505,R507-R509, R515-R518,R523, R524	RM73B2A332J RES-MET RN	323A5003J0332	16	
16	R20	RM73B2A122F RES-MET RN	323A5003F0122	1	
17	R1,R2	MSF1/2B2ohmJ RES-MET OX	324A1001J0209	2	

HBMC Printed Circuit Board Rev. 2
(4YA4121-2516G3-2/2-2/4)

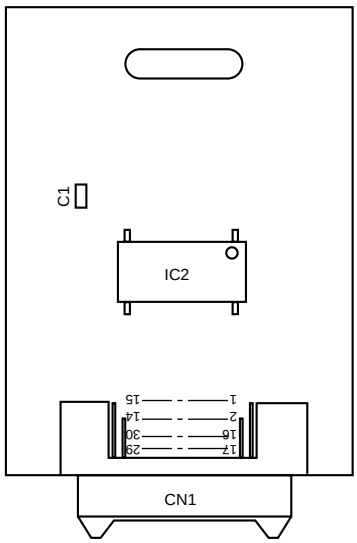
REF. NO.	SYMBOL	TYPE/NAME		PART NO.	Q'TY	REMARKS
18	R545	RM73B2A472J RES-MET RN		323A5003J0472	1	
19	R21,R542	RM73B2A102F RES-MET RN		323A5003F0102	2	
20	R540	RM73B2A432F RES-MET RN		323A5003F0432	1	
21	R51	RM73B2A362F RES-MET RN		323A5003F0362	1	
22	R541	RM73B2A223F RES-MET RN		323A5003F0223	1	
23	R56	RM73B2A204F RES-MET RN		323A5003F0204	1	
24	R100,R101	RD1/4Y2.2KohmJ RES-Carbon flm		321A1421J0222	2	
25						
26	C518,C519,C521	CC2012SL1H151J CAP-Ceramic	50V	303A3007K0151	3	
27	C515	CC2012SL1H561J CAP-Ceramic	50V	303A3007K0561	1	
28	C506	CK2012B1H102K CAP-Ceramic	50V	303A6008K3102	1	
29	C10,C18,C19	CK2012R1H223K CAP-Ceramic	50V	303A6008K3223	3	
30	C9,C12-C15,C501-C505,C509-C511,C513,C514,C516,C517,C520,C522,C523,C525,C526	CK2012F1H104Z CAP-Ceramic	50V	303A6008Z3104 304A1137A1332	22 1	
31	C524	CK2012B1H222K CAP-Ceramic	50V	303A6008K3222	1	
32	C7,C8,C16,C17	TCK45F2E103ZYA CAP-Ceramic	250V	302A4027Z5103	4	
33	C1	UVS1A332MHA CAP-Alum (CE)	10V	304A1137A1332	1	
34	C2,C4	KME50VB-47 KME50VB-47 CE CP	50V	304A1115H1470	2	

HBMC Printed Circuit Board Rev. 2
(4YA4121-2516G3-2/2-3/4)

REF. NO.	SYMBOL	TYPE/NAME	PART NO.	Q'TY	REMARKS
35	C5,C6	SME16VB-10-0A 16V CAP-Alum (CE) 10μF	304A1123C1100	2	
36	C3	SME16VB-47-0A 16V CAP-Alum (CE) 47μF	304A1123C1470	1	
37	C11	CK2012F1H473Z 50V CAP-Ceramic	303A6008Z3473	1	
38	IC3	SN74LS373NS Digital IC-BIP	700A0550N0373	1	
39	IC4	93C46LDP-NW Memory-MOSEEPR	8160303M0000	1	
40	IC11	514400JP-60 Memory-MOSDRAM-S	8020003N2603	1	
41	IC10	MTD2005F Analog-BIPLIN	720A1816N0001	1	
42	IC7	7407FP Digital IC-BIP	700A0003N0007	1	
43	IC5	PST592D-2 Analog-BIPLIN	720A4037M0015	1	
44	IC20	UPC393G2 Analog-BIPLIN	720A0523N0011	1	
45	IC6	MSM65917-015GS-K CPU-MOS (ROM ON) F	8530193N0015	1	
46	IC8	DS8925M I/F IC-BIP	710A2053N0002	1	
47	IC9	ICL7660CSA Analog-MOSLIN	730A1097N6001	1	
48	IC2	LH531H9W Memory-MOSMROM	8170649M0002	1	
49	SW1	KSP02G Switch-DIP	206A1083P0200	1	
50	SP1	IMSA9202B-1-03Z013GF Connector-PCB	224A4082P0030	1	
51	CN1	00-5062-301-023-000 Connector-PCB	224A5114P0230	1	
52	CN2	B8B-XH-A Connector-PCB	224A3530P0080	1	

HBMC Printed Circuit Board Rev. 2
(4YA4121-2516G3-2/2-4/4)

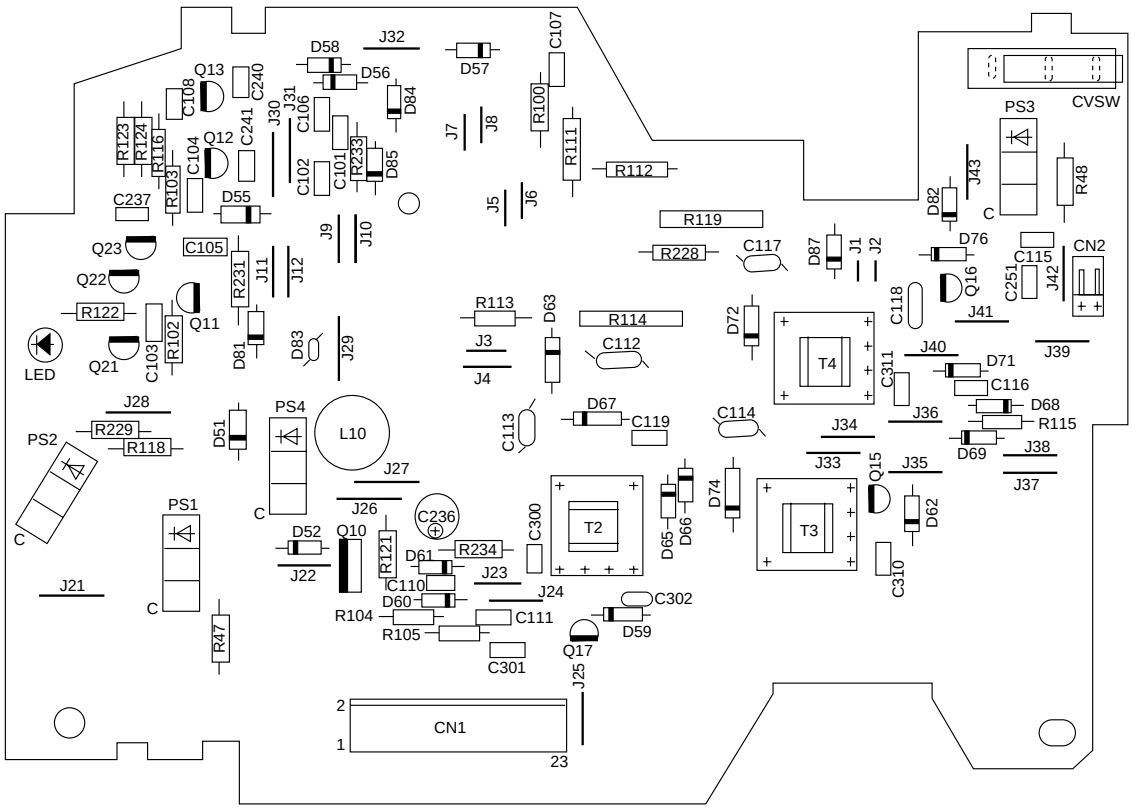
REF. NO.	SYMBOL	TYPE/NAME	PART NO.	Q'TY	REMARKS
53	CN6	ZC-014 Connector-PCB	224A3590P0140	1	
54	CN8	00-8263-0211-00-000 Connector-PCB	224A3358P0020	1	
55	CN4	57RE-40360-830B-D29A Connector-RECT	2201001P0361	1	
56	CN7	00-8263-0411-00-000 Connector-PCB	224A3358P0040	1	
57	CN9	TX25-30P-LT-H1 Connector-PCB	224A4172P0300	1	
58	CN5	MD-S8000-10 Connector-RND	2211000P0080	1	
59					
60	Q5	DTC124EK TR-NPN/H-FREQ	602A1035N0004	1	
61	Q4	2SA1338 TR-PNP/H FREQ	600A1032N0010	1	
62	Q3	DTC123YK TR-NPN/H-FREQ	602A1035N0019	1	
63	OSC1	CST10.0MTW OSC-Ceramic	381A1045B0014	1	
64					
65		DICF-32CS-E Socket-SEMICON	245A1221P0320	1	
66					
67		TW-VF-23-210-B CONN PAR	238A1123P0002	1	
68		IMSA-9206H-GF Connector-PCB	224A4080P0020	1	



HBRB-3 Printed Circuit Board
REV.1
(4YA4121-2502G3-1/2)

HBRB-3 Printed Circuit Board Rev. 1
(4YA4121-2502G3-2/2-1/1)

REF. NO.	SYMBOL	TYPE/NAME	PART NO.	Q'TY	REMARKS
1	IC2	5117400JP-60 MOS-D-RAM	8020003N4601	1	
2	C1	CK2012F1E104Z CK Capacitor	303A6008Z2104	1	
3	CN1	TX24-30R-LT1-H1 PC Connector	224A4171P0300	1	



OLHV Printed Circuit Board or REV.7 (4YA4130-1004G1-1/2)

TLHV Printed Circuit Board REV.3 (4YA4130-1024G1-1/2)

OLHV Printed Circuit Board Rev. 7
(4YA4130-1004G1-2/2-1/4)

REF. NO.	SYMBOL	TYPE/NAME	PART NO.	Q'TY	REMARKS
1	D60,D61,D68,D69	1S953/1S2075K/1S2473 Signal Diode	611A0003L0001	4	
2	D63, D67, D72, D74	DHM3FJ60/ESJA58-06 Rectifier Diode	610A0003M0002	4	
3	D51, D55-59, D62, D71, D81,D84	EU02A Rectifier Diode	610A0226M0016	10	
4					
5	D52,D85	1ZB300-Y/Z Zener Diode	613A2003M0001	2	
6	D65,D66	1ZB390 Zener Diode	613A2258M0350	2	
7	D87	RD200E-B Zener Diode	613A1231L0522	1	
8	D76	RD22E-B2 Zener Diode	613A1231L0262B	1	
9	D82	RD27E-B1 Zener Diode	613A1231L0282A	1	
10					
11	D83	ERZV05D471 Varistor-Resistor	6320229M0001	1	
12					
13	R234	RD1/4Y33ΩJ RD Resistor	321A1421J0330	1	
14	R47,R48	RD1/4Y130ΩJ RD Resistor	321A1421J0131	2	
15	R102,R116,R121	RD1/4Y330ΩJ RD Resistor	321A1421J0331	3	
16	R103,R123	RD1/4Y1KΩJ RD Resistor	321A1421J0102	2	
17	R118	RD1/4Y4.7KΩJ RD Resistor	321A1421J0472	1	
18	R122,R124,R229	RD1/4Y5.1KΩJ RD Resistor	321A1421J0512	3	

OLHV Printed Circuit Board Rev. 7
(4YA4130-1004G1-2/2-2/4)

REF. NO.	SYMBOL	TYPE/NAME	PART NO.	Q'TY	REMARKS
19	R105	RD1/4Y24KΩJ RD Resistor	321A1421J0243	1	
20	R104	RD1/4Y75KΩJ RD Resistor	321A1421J0753	1	
21	R113	RD1/4Y100KΩJ RD Resistor	321A1421J0104	1	
22	R228,R233	RD1/4Y1MΩJ RD Resistor	321A1421J0105	2	
23	R100	RD1/4Y3MΩJ RD Resistor	321A1421J0305	1	
24	R115	RNL1/4C3F576KΩ RN Resistor	323A1222F5763	1	
25	R111,R112,R231	HMP1/4-106J RN Resistor	323A1029J0106	3	
26	R114,R119	HV-38-100MK RK Resistor	326A3021K0107	2	
27					
28	C105,C107,C119	DE0705B471K1K 1KV CK Capacitor 470pF	302A4028K0471A	3	
29	C113,C114,C117	DE0707B471K3K 3.15KV CK Capacitor 470pF	302A4028K2471	3	
30	C112	DE1010B471K6K 6KV CK Capacitor 470pF	302A4028K4471	1	
31	C240,C241	DD05-63SL390J500 CC Capacitor 39pF	302A1202K0390	2	
32	C101,C102,C106	DD05-63B471K500 500V CK Capacitor 470pF	302A4003K6471	3	
33	C103,C104,C108,C110, C111,C115,C237,C251, C300,C301,C310,C311	FK16Y5V1H104Z CK Capacitor	303A4019Z3104	12	
34					
35	C116	FK16Y5V1H473Z CK Capacitor	303A4019Z3473	1	

OLHV Printed Circuit Board Rev. 7
(4YA430-1004G1-2/2-3/4)

REF. NO.	SYMBOL	TYPE/NAME	PART NO.	Q'TY	REMARKS
36	C118	CQMF92PP2A103J-F0 CQ Capacitor 0.010μF	306A4103J2103	1	
37	C302	CQMF92PP2A472J-F0 CQ Capacitor 0.0047μF	306A4103J2472	1	
38	C236	SME63VB-10-0A 63V CE Capacitor 10μF	304A1123J1100	1	
39					
40	Q11,Q13	BCR1AM-12/MAC97-008 Gate Thyristor SW	622A0003M0001	2	
41	Q12	CR04AM-12 Gate Thyristor OFF	620A0022M0008	1	
42	Q21-Q23	2SC1815-Y NPN-HF-TR	602A1025M0006Y	3	
43	Q15-Q17	2SC2235-Y NPN-HF-TR	602A1125M0039Y	3	
44	Q10	2SC2752 NPN-HF-TR	602A1223M0039	1	
45					
46	L10	C-14576 P Coil	350A2511P0102	1	
47					
48					
49	T2,T3,T4	High Voltage Transformer	4YB4049-7078P003	3	
50					
51					
52	PS1-PS4	SG-206 Photocoupler	652A0114M0003	4	
53					

OLHV Printed Circuit Board Rev. 7
(4YA4130-1004G1-2/2-4/4)

REF. NO.	SYMBOL	TYPE/NAME	PART NO.	Q'TY	REMARKS
54	CVSW	SS-5GL13 Microswitch	207A1025P0001	1	
55					
56	LED	SEL3910D-YZ LED	650A0229M0018	1	
57					
58	CN1	23FE-BT-VK-N PC Connector	224A4134P0230	1	
59	CN2	53254-0210 PC Connector	224A4407P0020	1	
60					
61					
62	J1,J2	0.65 Tin-plated Annealed Copper Wire	TA-0.65	2	
63	J3-J12	0.65 Tin-plated Annealed Copper Wire	TA-0.65	10	
64	J21-J43	0.65 Tin-plated Annealed Copper Wire	TA-0.65	23	

TLHV Printed Circuit Board Rev. 3
(4YA4130-1024G1-2/2-1/4)

REF. NO.	SYMBOL	TYPE/NAME	PART NO.	Q'TY	REMARKS
1	D60,D61,D68,D69	1S953/1S2075K/1S2473 Rectifyingl Diode	611A0003L0001	4	
2	D63, D67, D72, D74	DHM3FJ60/ESJA58-06 Rectifying Diode	610A0003M0002	4	
3	D51, D55-59, D62, D71, D81,D84	EU02A Rectifying Diode	610A0226M0016	10	
4	D52,D85	1ZB300-Y/Z Zener Diode	613A2003M0001	2	
5	D65,D66	1ZB390 Zener Diode	613A2258M0350	2	
6	D87	RD200E-B Zener Diode	613A1231L0522	1	
7	D76	RD22E-B2 Zener Diode	613A1231L0262B	1	
8	D82	RD27E-B1 Zener Diode	613A1231L0282A	1	
9					
10	D83	ERZV05D471 Zener Diode	6320229M0001	1	
11					
12	R234	RD1/4Y33ΩJ RD Resistor	321A1421J0330	1	
13	R47,R48	RD1/4Y130ΩJ RD Resistor	321A1421J0131	2	
14	R102,R116,R121	RD1/4Y330ΩJ RD Resistor	321A1421J0331	3	
15	R103,R123	RD1/4Y1KΩJ RD Resistor	321A1421J0102	2	
16	R118	RD1/4Y4.7KΩJ RD Resistor	321A1421J0472	1	
17	R122,R124,R229	RD1/4Y5.1KΩJ RD Resistor	321A1421J0512	3	
18	R105	RD1/4Y24KΩJ RD Resistor	321A1421J0243	1	

TLHV Printed Circuit Board Rev. 3
(4YA4130-1024G1-2/2-2/4)

REF. NO.	SYMBOL	TYPE/NAME	PART NO.	Q'TY	REMARKS
19	R104	RD1/4Y75KΩJ RD Resistor	321A1421J0753	1	
20	R113	RD1/4Y100KΩJ RD Resistor	321A1421J0104	1	
21	R228,R233	RD1/4Y1MΩJ RD Resistor	321A1421J0105	2	
22	R100	RD1/4Y3MΩJ RD Resistor	321A1421J0305	1	
23	R115	RNL1/4C3F576KΩF RN Resistor	323A1222F5763	1	
24	R111,R112,R231	HMP1/4-106J RN Resistor	323A1029J0106	3	
25	R114,R119	HV-38-100MK RK Resistor	326A3021K0107	2	
26					
27	C105,C107,C119	CCHNY5P4B471KTB 1KV CK Capacitor 470pF	302A4058K7471A	3	
28	C113,C114,C117	DE0707B471K3K 3.15KV CK Capacitor 470pF	302A4028K2471	3	
29	C112	DE1010B471K6K 6KV CK Capacitor 470pF	302A4028K4471	1	
30	C240,C241	CCTLSL4B390JTB 500V CC Capacitor 39pF	302A1017K6390	2	
31	C101,C102,C106	CCHLY5P4B471KTB 500V CK Capacitor 470pF	302A4057K6471	3	
32	C103,C104,C108,C110, C111,C115,C237,C251, C300,C301,C310,C311	FK16Y5V1H104Z CK Capacitor	303A4019Z3104	12	
33	C116	FK16Y5V1H473Z CK Capacitor	303A4019Z3473	1	
34	C118	MY2A103J-T CQ Capacitor 0.010μF	3062001J2103	1	
35	C302	CQMF92PP2A472J-FO CQ Capacitor 0.0047μF	306A4103J2472	1	

TLHV Printed Circuit Board Rev. 3
(4YA430-1024G1-2/2-3/4)

REF. NO.	SYMBOL	TYPE/NAME	PART NO.	Q'TY	REMARKS
36	C236	UVX1J100MTO511(5.0) 63V CE Capacitor 10μF	3041001J1100	1	
37					
38	Q11,Q13	BCR1AM-12/MAC97-008 Bi-Directional Thyristor	622A0003M0001	2	
39	Q12	CR04AM-12 Gate Thyristor	620A0022M0008	1	
40	Q21-Q23	2SC1740S Transistor	602A1035M0002	3	
41	Q15-Q17	2SD2451 Trsnsistor	603A1135M0010	3	
42	Q10	2SC2752 Transistor	602A1223M0039	1	
43					
44	L10	C-14576 P Coil	350A2511P0102	1	
45					
46					
47	T2,T3,T4	High Voltage Transformer	4YB4049-7078P003	3	
48					
49					
50	PS1-PS4	RPI-574/#9568 Photocoupler	652A0103M0002	4	
51					
52	CVSW	SM-05S-04A-9 Microswitch	207A2020P0001	1	
53					

TLHV Printed Circuit Board Rev. 3
(4YA4130-1024G1-2/2-4/4)

REF. NO.	SYMBOL	TYPE/NAME	PART NO.	Q'TY	REMARKS
54	LED	SEL3910D-YZ LED	650A0229M0018	1	
55					
56	CN1	23FE-BT-VK-N Printed-Circuit Board Connector	224A4134P0230	1	
57	CN2	53254-0210 Printed-Circuit Board Connector	224A4407P0020	1	
58					
59					
60	J1,J2	0.6 Short Wire	TA-0.6	2	
61	J3-J12	0.6 Short Wire	TA-0.6	10	
62	J21-J43	0.6 Short Wire	TA-0.6	23	
63					
64					

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